Undergraduate Physiotherapy Students' Choice and Use of Technology in Undertaking Collaborative Presentations

Thesis

Undergraduate Physiotherapy Students' Choice and Use of Technology in Undertaking Collaborative Presentations

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Doctorate in Education

2009

Centre for Research in Education and Educational Technology,

The Open University

Abstract

This case study explored students' preferences and use of technology for collaborative learning. The participants were third year physiotherapy undergraduate students working in small groups to produce a weekly seminar presentation (n=86). The main study was carried out in 2007/8. The groups were organised based on students' expressed preference for using technology. Data collection tools were interviews, questionnaires, observation and analysis of online natural trails. Ethical approval was granted by HPMEC in 2006.

Students' choice of technology related to past experience, efficiency, quality of interaction, inclusivity and they used the technology online provided by the university rather than open source. They highly valued the specialised collaborative classroom that included computers and data projectors that enabled a group to visualise their output and connect to their online group sites. They used the online environment (the University's MLE) largely as a repository, 'offloading' some of the organisational components of collaboration and for knowledge acquisition, using the face-to-face meetings for interaction and co-construction. They used asynchronous discussion facilities for basic administration. Students wanted their education and social technologies e.g. Facebook kept separate.

What differed in the groups was the level of face-to-face interaction to undertake the task collaboratively, as opposed to sub-dividing the task and working more cooperatively. The students were committed to collaborative working, but were

focussed on face-to-face for co-construction of knowledge, which may relate to the professional culture and programme design.

This study has implications for the introduction of technologies into health courses. Students need formative experience in other online technologies so that graduates can participate effectively in continuing professional activities. This needs to be introduced in an authentic situation such as when students are on placement and unable to meet face-to-face. Further research into what technologies may support collaborative learning for health students.

Acknowledgements

Firstly I must thank the students who participated in this study and to all of the students who over the years have participated in my evaluations, both formal and informal, that have led to this study.

I would also like to thank my first supervisor, Peter Twining, who was my supervisor for year 1 and part of year 2. Considerable thanks go to Jenny Spouse, my second supervisor, for her constant encouragement, and for 'taking me on', never easy when the research is already in process. I would also like to give sincere thanks to Linda Haggarty and her 'team' for their support when I was unexpectedly rushed to hospital for surgery at the end of year 1.

I must also thank my colleagues, who I am sure will be nearly as glad as I am that I have got to this point, especially Karen, Peter and Jon for their funding and support. Also, thanks go to Janet, Mary, Stephanie and Jane for all of their encouragement along the way.

Finally, a big thank you goes to my family Nick, Gregory and Abbey, who accepted that this study was important to me. Families always suffer during such studies. Thank you for all the technical support and coping with the 'instant dinners', and to Nick for coping with the piles of articles and books all over the floor of our office – I will now tidy them up!

Abbreviations

Term	Definition
BL	Blended Learning – where face-to-face and online methods (e-learning) are combined
Blend	The combination of face-to-face and online (e-learning)
BLU	Blended Learning Unit – a Centre for the Enhancement of Teaching and Learning
CL	Collaborative Learning – where students work together on a task to produce a collaborative output
CSCL	Computer Supported Collaborative Learning
CSP	Chartered Society of Physiotherapy
CIT	Communication Information Technology
HE	Higher Education
LRC	Learning Resources Centre – at UH
MLE	Managed Learning Environment – a web based online learning environment that links with students' results and administrative systems
StudyNet	The University of Hertfordshire's M.L.E.
UH	University of Hertfordshire
Year 2	The second year of the students' programme
Year 3	The final year of the students programme

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Chapter 1. Introduction

This thesis explores the undergraduate physiotherapy students' choice and use of technology when undertaking weekly seminar presentations in the final year of their programme. In this chapter I will outline the layout of the thesis and the background to this study.

1.1 Introduction to the structure of the thesis

In writing a thesis it is difficult to present as authentic an account of what is a complex journey. Much of the literature discussed in the literature review was not published at the outset of the study, the proposed methodology naturally was adapted to unforeseen realities of practice, some data was given priority as I focused my findings and finally my recommendations are moderated by the realities of the practice context in which I work. I have written this in a reflexive style to give as authentic account as possible. The structure of the thesis is as follows:

Chapter 1 - Sets the scene to explain the background to this study.

Chapter 2 - Gives an overview of relevant theory and analysis of key research in the particular area of the study

Chapter 3 - Discusses how the investigation of my research questions was carried out

Chapter 4 - Reports on my findings

Chapter 5 - Discusses the implications for practice

Chapter 6 - Presents the conclusions

Chapter 7 - Presents personal reflections

This is followed by a list of references and the appendices.

1.2 Background to this study

The background to this study includes the history and the rationale that lead to the research questions, a description of the module the students were studying, the profile of the students and the details of the technology available to them.

1.2.1 The Historical Perspective

The start of my journey into researching computer supported collaborative learning (CSCL) was in 2002 when I was working as a senior lecturer at the University of Hertfordshire (UH). Previous to moving into Higher Education, I was a manager in the NHS and I had responsibility for six different health disciplines. I had facilitated team working and gained a reputation for my ability to get teams to function to meet the patients' needs. I had seen the value of collaborative working in learning but I was concerned that often graduates did not have good collaborative skills. I was not alone in this thinking. It has been recognised across health education and has resulted in the development of inter-professional learning in all health undergraduate programmes (2007). This has also led to a greater use of Problem based learning (PBL) (Biggs, 2003) that was developed initially for health disciplines aimed at encouraging students to solve problems in small groups.

This recognition of the power of small groups for learning led me to adopt collaborative learning when I became module lead of a 45 credit third year module, 'Perspectives of Healthcare Provision', on the undergraduate physiotherapy programme. At this time, the University of Hertfordshire where I work, was introducing a managed learning environment (MLE) called StudyNet. I decided to use

the facilities on StudyNet to support the students' collaborative learning. Following my instigation of collaborative learning I evaluated the students' perspective (Alltree & Thornton, 2004; Thornton & Alltree, 2002). What became apparent was that some students were very positive about using technology for learning whereas others were not. For example, in one cohort there was a very positive reception overall for the use of the MLE but twelve students (18%) said they did not use StudyNet to support their studies. One student 'still hated' computers and two said the experience had changed their view of computers for the worse, including the following comment:

> *'I am actually getting a bit peeved that a degree in PHYSIOTHERAPY appears to be becoming integrated with a required degree in computer skills!!'*

At this time much of the technology was new, many students didn't have their own computers and social networking sites were not available. Subsequently as a result of my research in using the MLE I was one of the twelve tutors in a successful bid for setting up a CETL called the Blended Learning Unit (BLU) at UH. The University has a very strong commitment to blended learning which the BLU unit defined as:

> *"combining e-learning opportunities and traditional campus-based learning in reflective and innovative ways" (Bullen, 2005).*

Following revalidation I took over the lead of the module Advancing Practice (AP), which was developed from Perspectives of Healthcare Provision. AP is the module that will be the focus of this study.

Through my reflective practice I noticed that student groups were working in very different ways and that the use of technology appeared to impact on group working. Due to the widening participation agenda, the diversity of the cohort was increasing with about 40% of the cohort being mature. Thus the cohort was made up of students who had grown up with the use of technology for learning and life in general, what are often described as 'Net generation learners' (Oblinger & Oblinger, 2005) or 'Digital natives' (Prensky, 2001), and other students who had very limited prior experience of technology use – digital immigrants. However the preference was not simply related to generation. For example, some of the mature students were very keen and competent in using technology and wanted to work online due to other commitments that made face-to-face contact difficult. In addition the technology environment has rapidly developed. When I started this study Web 2.0 was just starting to be adopted in HE practice.

I was aware that some academics working in health had tried to introduce the use of online technologies into the curriculum but in some cases the students hadn't used them. This had unfortunately been interpreted by some lecturers as students being lazy, not working well with each other or not engaged with their learning. Others had suggested this was due to technical inabilities (Davies, Ramsey, Lindfield, & Couperthwaite, 2005). As a teacher working in BLU I was concerned that technology was not matching the students' needs. Finally BLU had developed a specialised collaborative learning room and I wanted to see how this might fit into the overall student experience. These factors were combining to stimulate my interest in the students' perspective of using technology for collaborative learning.

One of the underpinning aims of blended learning is to increase flexibility and improve the students' experience. So I wanted to gain a better understanding of the students' choice and use of technology to undertake collaborative tasks. To try and enhance this choice, given the diversity in the cohort, I enabled students to express a preference for technology use. I then organised the students' collaborative groups on the basis of the students' expressed choice of blend for collaborative learning. This I reasoned would enhance their communication by whatever means they chose, be that face-to-face or by using any technological application available to them.

1.2.2 The Research Questions

The tensions that I wanted to explore were the relationship between technology and collaborative learning in this particular context: physiotherapy undergraduate students undertaking weekly collaborative presentations in an environment where they had technology available to them in the classroom and online.

Following on from many changes and iterations the resulting research questions were:

Overarching question:

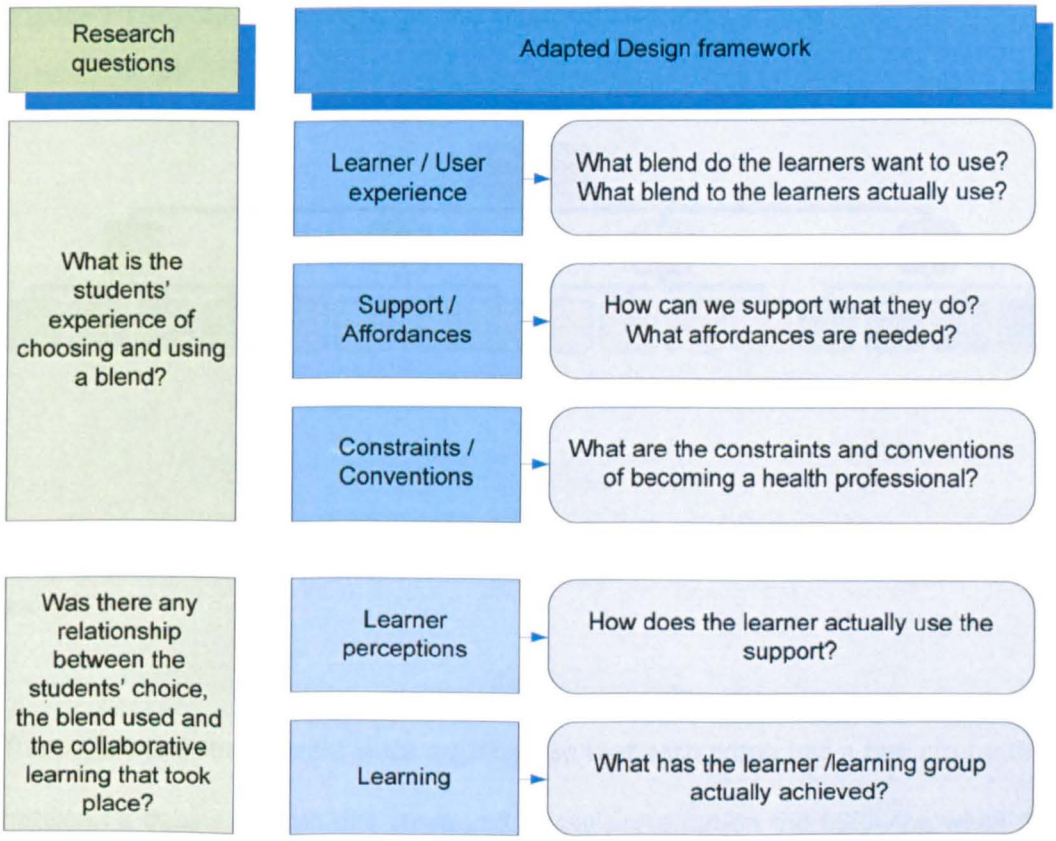
> How does the experience of choosing a blend influences physiotherapy students' experience of collaborative learning in a campus setting?

Sub questions:

1) What was the student's experience of choosing and using a blend?
2) Was there any relationship between the student's choice, the blend used and the collaborative learning that took place?

These questions relate to the six stage model of educational design (Kirschner, Martens, & Strijbos, 2004). I have chosen this model as Bower (2008) suggests this model is less focused on the technological design than some other approaches and starts with the students' choice. I have adapted the framework questions in the final column on the right to reflect this study (Figure 1). I have adapted the learner/user questions to include 'blend', and the constraints/conventions to focus on the health discipline. Readers not familiar with the term affordance may wish to read 2.3.3.

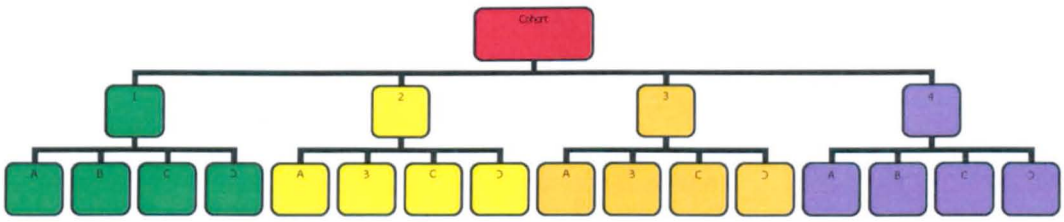
Figure 1 The research questions applied to the six-stage model adapted from (Kirschner, Martens, & Strijbos, 2004)



1.2.3 The Module

Advancing Practice (AP) is in the third year of the Physiotherapy honours degree at the University of Hertfordshire. It is a 30 credit module at level three and runs in Semester A and B. In AP the principles of all previous themes are integrated and deepened. This module encourages students to extend their view of physiotherapy and health care and to take into account the particular needs of different client groups. The focus of this study was on the collaborative work in Semester A where four major client groups were studied. The students were divided into four classes and then each class was divided into four small groups, these were the collaborative learning groups and were made up of 5-6 students as shown in Figure 2.

Figure 2 The cohort, class groups and small collaborative groups

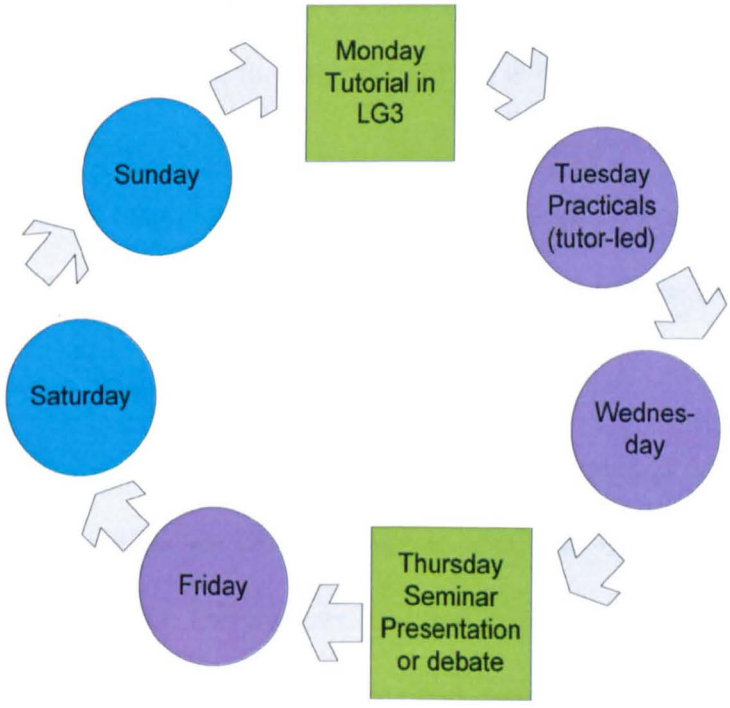


Each colour represents a class group which is subdivided into four collaborative groups.

The on-campus study weeks were organised so that each group had a task alternating between a debate motion one week and a case presentation the following week. To support these activities students had a tutorial on the Monday of each week, where

the tutor was present and then they were expected to organise their work as a group to prepare for the presentation on the Thursday. The debates used an electronic voting system that enabled rapid anonymous voting, for voting prior and after the presentations and discussions, this use of technology is supported by previous student evaluations (Thornton, 2006; Thornton & Groefsema, 2006). In addition they had practical sessions that are tutor led on the treatment skills needed for the case being studied. The students' weekly timetable for Advancing Practice is illustrated in Figure 3.

Figure 3 A week in Advancing Practice



The task set for the students each week is to produce a presentation on a case or debate. For the case presentation students read the case and then as a group use clinical reasoning to develop an answer which is based on using evidence from the literature and their own clinical experience. An example question would be:

- Critically discuss and justify an appropriate physiotherapy treatment and management plan for Mrs Jones's presentation.

For the debates the students are given a stance i.e. to prepare an argument for or against the debate motion. One group argues for and another against. An example of a debate motion is:

- Setting up and running exercise classes in nursing homes is not the role of a physiotherapist.

In every seminar, the groups and the tutor in the audience, write feedback sheets for the group presenting on both the presentation aspects and the content. In addition, all of the presentations are loaded onto StudyNet and act as a learning resource. The seminar questions form the basis of the written exam that the students sit at the end of semester A. The seminar feedback is formative and supports the students to develop their presentation skills for the assessed presentation in semester B, which is based on the clinical skills development sessions they receive in semester B.

1.2.4 The Participants - Students

This is a vocational course. On completion graduates can become members of the Chartered Society of Physiotherapy (CSP) and register with the Health Professions Council (HPC). The students' fees and expenses of clinical placements are funded by the Strategic Health Authority and some students are on bursaries, from the Department of Health, that are means tested. They are not HEFCE funded. The majority of the students are employed in the NHS for their first post. Until 2007 students had very good employment prospects, however since that date due to a greater number of graduates there has been more competition for posts. The

physiotherapy undergraduate course has historically been heavily oversubscribed, resulting in a high academic profile of successful applicants, although recent difficulties with employment have reduced the numbers of high calibre applicants.

On admission to the programme in 2005 there were 921 applicants of which 105 were offered a place. The profile on admission is described in Table 1.

Table 1 The profile of the cohort on admission

Gender	Female	Applications: 620 Admissions: 78
	Male	Applications: 301 Admissions: 27
Ethnicity (there were other categories but no applicants under them)	White	96
	Mixed	2
	Asian / British	2
	Black / British	4
	Other ethnic	1
Age	21 and Over	44.09%
	Under 21	55.91%

Since admission, a number of students had left the course or had not progressed at the standard rate into the third year. Entering the third year there were 88 students, one student subsequently withdrew, leaving 87 for group allocation, with a further student leaving the cohort mid-semester A.

1.2.5 The Technology available

The students had technology provided by the University of Hertfordshire (UH) for collaboration both online, in the classroom and in the Learning Resources Centre (LRC). They also had open source facilities that could be accessed through the internet.

StudyNet

StudyNet is the university's managed learning environment (MLE). It has comprehensive facilities for online learning. In particular the students have private group sites that they can use for their collaborative tasks. These private group sites have:

- News items – asynchronous text
- Discussion facilities – threaded asynchronous text, each entry needs to be clicked on to open
- Blogs – chronological text entries, able to view all entries and scroll
- File sharer – repository with check out function
- Project planner – planning tool
- Tagging – ability to tag (allocate a key word) to resources and entries to discussion sites
- Wiki – collaborative writing tool enabling editing and saving of all changes.

Tutorial room LG3

The tutorial on the Monday was in our high technology collaborative learning room, LG3. This has furniture that is designed for group work and the following technological facilities:

- A networked computer

- Data-projector for each group area
- Interactive white board for each group area

LRC group rooms

In addition in the LRC there are group rooms that have a collaborative table, computer and data projector. These rooms are in high demand and so were not always available.

Free Open Access Software

Students also have access to open access applications via the internet. The availability of open source technological applications has increased dramatically during the study. When I first started this study social networking sites were not in widespread use, for example only one student mentioned Facebook in the pilot whereas by the main study's interviews, all of the students were on Facebook. In addition, at the start of this project, MSN provided only instant messaging. By the conclusion of the project it had voice and visual functionality. In the session at the end of year 2, when I orientated the students to the technologies available to them, the following were discussed and demonstrated:

- Skype – a voice over internet protocol application with instant messaging functions
- MSN – instant messaging
- Social networking sites (e.g. Facebook, MySpace and Beebo).

Chapter 2. Literature review

This chapter provides a narrative literature review, exploring the relevant literature to understand what is known in relation to my study. In this study I am exploring the students' experience of collaborative learning and so I discuss the theoretical basis of collaborative learning. However, I am exploring it in the specific context of blended learning at the University of Hertfordshire (UH) and with Physiotherapy students as the participants - so I have focused on the literature which is relevant to this context. As my interest is in the students' experience of choosing and using a blend I also discuss choice.

In this literature review I will discuss:

- The challenges in undertaking this literature review
- The meaning of collaborative learning and related learning theory
- Blended learning, including affordance and models for collaboration
- Health students' use of a blend for collaborative learning
- Choice, including related theory.

2.1 Challenges of undertaking research in a developing field.

There were a number of issues in exploring the literature. The use of computers for collaborative learning was and still is a rapidly developing field, yet the focus of my study was original as it included both classroom technology and online. It focussed on the students experience and within a discipline that was less represented in the research literature.

The topic area of this study continued throughout the study to develop rapidly, both in the technology being used and the research being undertaken. There is considerable literature on collaborative learning, although the field of computer supported collaborative learning is still rapidly developing (Orvis & Lassiter, 2007; Strijbos, Kirschner, & Martens, 2004) and hence there are many authors trying to establish a research profile in this area with resulting prolific output and new texts (Garrison & Vaughan, 2008; Orvis & Lassiter, 2007). There has been much published since the start of the study in 2006/7, for example in three months in 2007 there were 608 articles published on computer supported collaborative learning in one search engine (ERIC).

However, at the onset of this study there was limited literature focusing on the student experience (Sharpe, Benfield, Lessner, & Decicco, 2005), especially in the health discipline. Many studies have used a specific technology that students have been directed to use, rather than to look at the overall blend and the students' choice. There is considerable work on distance learning, and some research exploring a blend that includes face-to-face or online but didn't bring technology into the classroom. In my study students used technology in the classroom and online and my interest was in the students' overall experience. Technology is constantly changing and this makes comparison between studies difficult especially as the terminology applied differs. In the Health discipline at the beginning of the study there was not a clear body of work.

Much of the research has also focussed on the disciplines most associated with computer use, e.g. computer science and engineering, and when I started this work there was little published in the health disciplines. The majority of the literature has

been published since 2007; as a result my literature review has been extensively rewritten from the start in 2006.

To address these challenges I focussed on key existing literature in 2006 and then during the progress of my study began to include new texts. I focussed my searching for research studies on my particular student group – health students and physiotherapy students in particular. In addition, I attended and participated at appropriate conferences to orientate myself to other work and my colleagues' views on my own work.

2.2 What is collaborative learning?

This section will define collaborative learning, discuss some of the related learning theories and consider why collaborative learning is relevant for health students.

2.2.1 Definition

Collaborative learning is central to my study as it is the underpinning pedagogy - the students will be working and learning in small groups. Collaboration is:

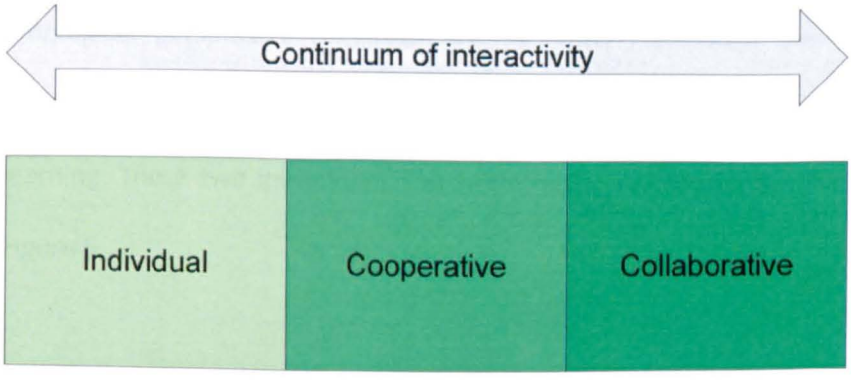
> *"a process of shared creation; two or more individuals ...interacting to create a shared understanding that none had previously possessed or could have come to on their own" (Schrage, 1990 p40).*

Collaborative learning in Higher Education (HE) tends to be formalised and to have a number of characteristics: a defined small group, an authentic task, with students interacting through dialogue, be this face-to-face or online (Gupta, 2004; Paulus,

2005). Collaborative learning is rapidly replacing more didactic teaching approaches and is distinctive in the creation of knowledge through social activity (Schrage, 1990; Stahl, 2003).

Collaborative learning as practiced in health education in HE takes place in small groups and so this has been my focus for this study, rather than 'networked learning' which describes a form of relational learning in 'networks' or 'communities' (Jones, 2007). In these small groups or teams students may work very closely or may allocate different tasks or roles in the team that are then bought together in a "jigsaw" (Schweizer, Paechter, & Weidenmann, 2003) approach. The latter is often described as cooperative learning (McConnell, 2000; Paulus, 2005; Slavin, 1995), where work is shared out between individuals and then collected to make a whole. Some authors suggest that this there is a key distinction between cooperative learning, (a parallel activity of individuals) and collaborative learning, (where the meaning-making is co-construction (Dillenbourg, 2000; Suthers, 2006)). This relates to the different learning theories and the level of interactivity, the collaborative continuum is illustrated in Figure 4.

Figure 4 The collaborative continuum



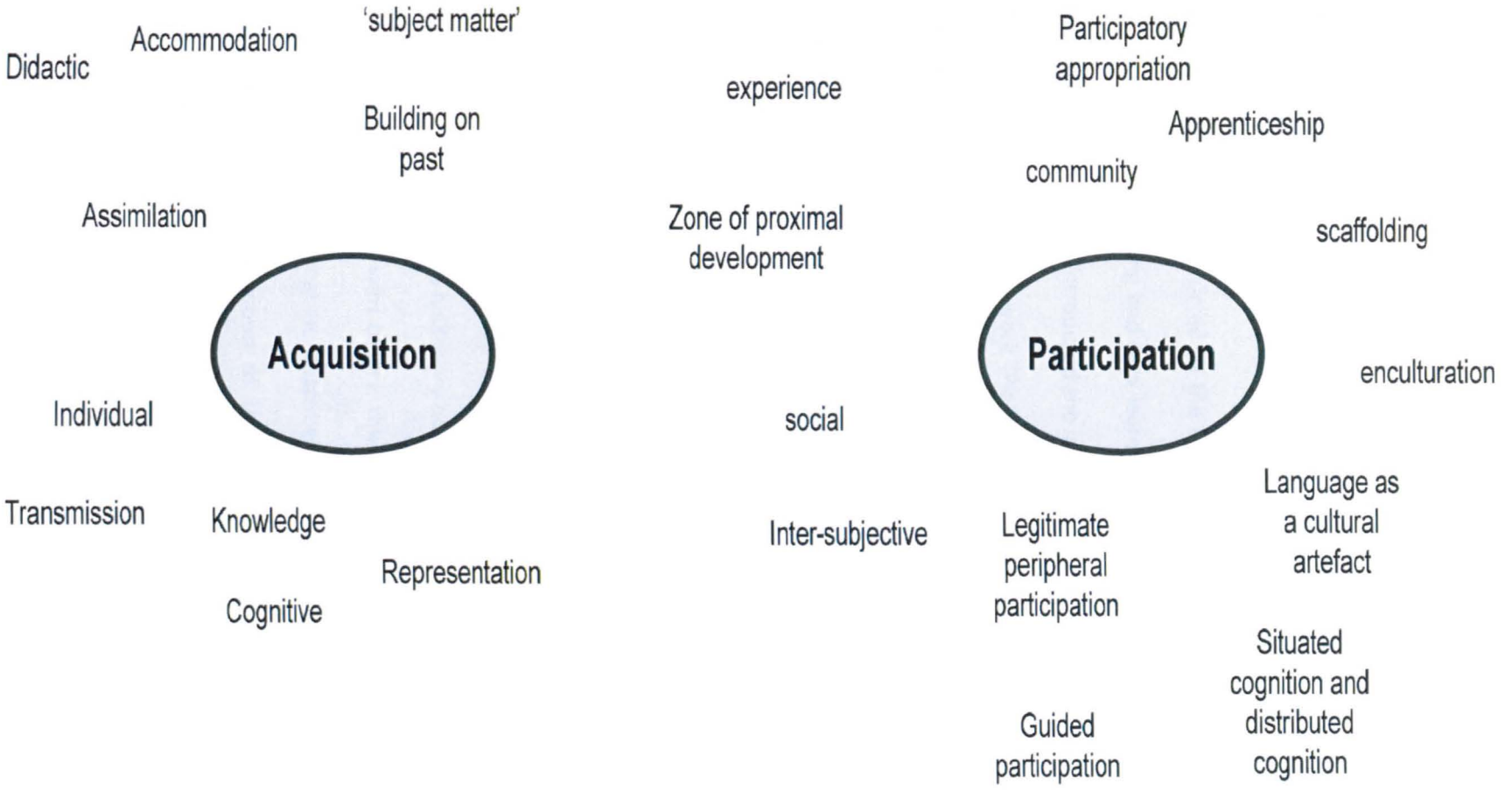
Where collaborative learning is undertaken using some aspect of computing it is often described as computer supported collaborative learning (CSCL)(Orvis & Lassiter, 2007; Strijbos, Kirschner, & Martens, 2004), although this can include both blended and purely online environments. The abbreviation is also used for cooperative learning (McConnell, 2000) and Computer Mediated Learning (CML) is also used by some authors.

2.2.2 Learning theory

There are many theories of learning and they each have different perspectives, emphasis and terminology that contribute to our understanding of collaborative learning.

Two metaphors most prevalent in the literature are those of "acquisition" and "participation" (Paavola, Lipponen, & Hakkarainen, 2004; Sfard, 1998). Sfard proposes two metaphors for learning - 'acquisition' related to the instructional model and 'participation' where learning in a social context views "*knowing*" as a sense of "*belonging, participating and communicating*" (Sfard, 1998). At the extreme end of the acquisition metaphor the student can be filled up with "subject matter" with the ontological perspective of knowledge as "facts", although this has largely been rejected by current educational thinking, and has little relevance to collaborative learning. These two metaphors and some of the related terminology are mapped in Figure 5.

Figure 5 Terminology associated with the two metaphors of learning



Constructivism is the concept that the learner constructs knowledge rather than simply receiving knowledge like an empty vessel to be filled. Cognitive constructivism describes the theory based on the work of Piaget (1972) that meaning is created by the individual within their environment. He suggests that the individual learns by accommodating (taking on new ideas) and assimilating (changing their current structure of thought) and so knowledge is reconstructed by the learner. Piaget emphasizes how prior knowledge will impact upon learning and how learning is dependent on the individual's experience and maturation. Piaget introduced the idea that cognitive conflict is an important aspect to learning. In his original work (Piaget & Inhelder, 1969) he suggests social exchanges lead to the differentiation between the individual child's point of view and ability to cooperate in action and communication. This occurs through a process of socialization. It must be remembered that he undertook his studies on children and although he places the emphasis on individual mental development through experience and socialization, his fundamental factor in development is organic growth.

Social constructivism suggests that meaning is created through social interaction, the use of language and shared experience, and is derived from the work of Vygotsky (1930/78). Vygotsky (1930/78) based his theory on studying children and noting that they developed more when interacting with others, thus knowledge creation was a social process with learning occurring in what he described as the zone of proximal development (ZPD). Vygotsky's original description of the ZPD was the difference between the actual development level and that which can potentially be achieved through problem solving in a social setting. This applies equally to voluntary attention, to logical memory, and to the

formation of concepts, there is interpsychological development followed by intrapsychological development. All the higher intellectual functions originate as:

> *"actual relationships between individuals" (Vygotsky, 1978 p57)*

Vygotsky views learning as the interactions with more knowledgeable others, in applying this to HE this could be the student with a differing point of view or deeper understanding. The difference creates the ZPD and the dialogue is the process through which knowledge is created that can then be internalised. Social constructivism is becoming a very strong pedagogic influence (Carson, 2005; Elkind, 2004, 2005; Sharpe, Benfield, Lessner et al., 2005) on educational practice.

However the interpretations of Vygotsky's (1930/78) work differs between authors and hence I have put ZPD in the middle of the two metaphors in Figure 5. ZPD has been interpreted in many ways (Daniels, 2001; Lave & Wenger, 1991), with later interpretations distinguishing between a *"'scaffolding', a 'cultural' and a 'collectivist' or 'societal'"* emphasis (Daniels, 2001 p59). To demonstrate the level of confusion and overlap, Vygotsy's work (1930/78) is quoted by some as focused within the acquisition metaphor (Sfard, 1998), as he describes interpsychological development followed by intrapsychological development. But, reflecting the many ways in which his "zone of proximal development" has been interpreted, Paavola, Lipponen, & Hakkarainen (2004) place his work within 'participation'.

The "participation" metaphor is focused on learning as a socio-cultural activity where learning is viewed as participation. "Knowing" cannot be separated from the "situated" context (Brown, Collins, & Duguid, 1989). Participants learn through their actions in socio-cultural practice. Rogoff (1995) describes learning as occurring through apprenticeship (culturally acquired activity) and guided participation (the interpersonal processes and systems) and participatory appropriation (how the individuals change).

Lave and Wenger (Lave & Wenger, 1991; Wenger, 1998; Wenger, McDermott, & Snyder, 2002) see learning as situated within a community of practice (COP). They suggest that:

> *"a person's intentions to learn are engaged and the meaning of learning is configured through the process of becoming a full participant in a socio-cultural practice"* (Lave & Wenger, 1991 p29).

They suggest the concept of legitimate peripheral participation where an individual learns to move to a more central location within the COP. However, the central location is constantly moving depending on the social dynamics and power structure within the community, and hence there isn't a static central point. The learning is situated with participants engaging in various ways in the community:

> *"changing locations and perspective are part of actor's learning trajectories, developing identities, and forms of membership"* (Lave & Wenger, 1991 p36).

Participation theorists emphasise the importance of the social element in learning, and that learning knowledge cannot be 'abstracted' from the social context in which it is being learnt. The perspective of professional practice has also been linked to the situated perspective (Beetham & Sharpe, 2007). Within this context 'situated' can relate to the

extent to which it is authentic and directly related to practice, for example PBL and case based studies in health. Stahl (2004a) suggests the group unit as key in collaborative learning as the group provides the conditions (the ZPD) for learning. It is the group that shapes meaning through social interaction, by increasing opportunities for dialogue so 'intersubjective' learning (Suthers, 2006) can be enhanced.

These theories all have a different emphasis but in common with other authors (Anderson, Greeno, Reder, & Simon, 2000; Garrison & Vaughan, 2008; Paavola, Lipponen, & Hakkarainen, 2004; Salomon & Perkins, 1998; Sfard, 1998; Stahl, 2004b; Suthers, 2006) my perspective is that the theories do not need to be seen as competing and can all help to further our understanding of the complexity of collaborative learning. Theories are but an interpretation of how the students are learning. What the students actually do remains the same; it is our interpretation and terminology that differs. For example Rogoff's (1995) guided participation can be seen to have parallels with the zone of proximal development (Vygotsky, 1930/78) and the terminology of scaffolding or script (Dillenbourg, 2000). Thus, as described by Saloman and Perkin's (1998) paper, there are inter-relationships between the dimensions of individual, social, acquisition, and participation continuums. As Suther (2006) suggests defining learning is itself problematic, all we can do is describe an activity that is more likely to lead to learning, in this case collaboration in meaning-making. If we take the interaction and dialogue with others, as being important then it can be supposed that the greater interaction and dialogue, the more learning will be enhanced. This is where technology can provide support, in enhancing opportunities for learning.

In addition to the acquisition participation metaphor, is the theory of surface and deep learners, originally put forward by Marton & Säljö (1976) and developed by others (Biggs, 2003; Trigwell, Prosser, & Waterhouse, 1999). This work suggests a relationship between how students perceive the task and how this influences their approach. "Surface" learners are focused on getting the task done and memorising information with minimum effort. "Deep" learners are focused on meaningful learning and development. One aspect in this theory is that the authors tend to suggest knowledge can be abstracted from the context. In this theory learning is categorised into five categories. In the first three categories learning as a quantitative increase in knowledge, memorising and acquiring facts that can be seen to resonate more with the acquisition metaphor. In category four that is "learning as making sense" and five "integrating and understanding reality in a different way" learning is more an interactive and social process. A relationship has been found with teacher approaches and students learning, with teachers who focus on transmission encouraging surface approaches whereas teachers who see learning as helping students to develop and change their conceptions encouraging a deep approach (Trigwell, Prosser, & Waterhouse, 1999).

Others have proposed different terms e.g. "knowledge creation" (Paavola, Lipponen, & Hakkarainen, 2004), "intersubjective learning" (Suthers, 2006), community of enquiry (Garrison & Vaughan, 2008) or adapted theory specifically to CSCL (Stahl, 2004b). Garrison and Vaughan (2008) suggest there is a need to embrace the personal and public worlds of learning, which they achieve through their 'community of enquiry' framework.

This includes social presence, cognitive presence and teaching presence (structure and process). The challenge as stated by Sfard (1998) is to embrace "learning" as:

"relinquishing either AM [acquisition metaphor] *or PM* [participation metaphor] *may have grave consequences whereas metaphorical pluralism embraces a promise of a better research and a more satisfactory practice"* p10 (Sfard, 1998).

Taking Vygotsky's work and the concept of social participation it can be suggested that ***interaction*** through discourse is a key aspect for learning. I will use the term 'co-construction' for collaborative activity, as constructivism remains the dominant learning theory in the post compulsory education sector (Beetham & Sharpe, 2007).

2.2.3 Why use collaborative learning for health students?

Collaborative learning can support the development of competences that are required in healthcare students. Competences in interpersonal skills, tolerance, integrity and team working are essential for Allied Health Professionals in today's health service (Pew Commission, 1998). A major driver in healthcare is for patient centred care teams which evidence suggests are more effective than individual discipline approaches (McPherson, Headrick, & Moss, 2001) and underpins the reason to introduce inter-professional learning at an undergraduate level. So strong is this professional requirement that at the University of Hertfordshire, students who are not able to work in teams in a professional way could be taken to a professional suitability panel.

Collaborative learning is essential for health students to develop the competences for practice. The introduction of technology both in the classroom and online can enhance the students' opportunities for collaboration.

2.3 Why use a blended approach for collaborative learning?

This section will discuss blended learning, the theory of affordance and the relationship of technology to professional physiotherapy practice. Key articles related to my study will be discussed.

2.3.1 Definition of Blended Learning

Historically, when technology was first introduced into HE, there were two distinct approaches, face-to-face campus based or online distance learning (Sharpe, Benfield, Lessner et al., 2005), often described as e-learning (Salmon, 2000). Now most universities are adopting a blended learning approach (Garrison & Vaughan, 2008; Littlejohn & Pegler, 2007; Sharpe, Benfield, Lessner et al., 2005). This is aimed at taking the best from both approaches and to use technology as a lever for learning (Chickering & Ehrmann, 1996) which has resulted in converging research threads (Ausburn, 2004). The definition of blended learning is yet to be universally agreed (Macdonald, 2006; Sharpe, Benfield, Lessner et al., 2005) and this has resulted in many critics of its use (Oliver & Trigwell, 2005). Sharpe et al, (2005) suggest that its precise definition should be made locally due to the specific context in which it is being applied in each institution. In light of this, the following definition adopted by the Blended Learning Unit (BLU) at the University of Hertfordshire (UH) will be used:

"combining e-learning opportunities and traditional campus-based learning in reflective and innovative ways" (Bullen, 2005).

Although it can be argued that BL isn't always innovative, the aim is however to integrate the online and face-to-face approaches to achieve effective learning (Kerres & Witt, 2003).

2.3.2 Why use blended learning?

Simply adding technology does not necessarily enhance learning (Kirkwood & Price, 2005), although research suggests a blended environment can enhance learning (Garrison & Vaughan, 2008; Schellens & Valcke, 2005; Taradi, Taradi, Radic, & Pokrajac, 2005).

For example, in a controlled study by Taradi *et al*, (2005) problem based learning and a blended environment were combined. The control group had a normal face-to-face traditional experience; the students who experienced the blended PBL group performed better and were more satisfied. More relevant to the context of this study, an analysis carried out by the Learning and Teaching Development Unit at UH found a positive correlation between academic results and use of StudyNet. It has been suggested that students achieving better results in blended environments might be due to the student having greater opportunities for social dialogue using the online environment in addition to their face-to-face activities (Ausburn, 2004). This enhancement would be supported by the work of Vygotsky (1930/78) that social dialogue between peers is a key aspect of learning. The blended learning environment can give choice and greater collaborative learning possibilities, dependent on their use. However technology needs to be used to

meet the needs of the student in the specific context (Beetham & Sharpe, 2007). The blended approach has the potential to offer flexibility in time, space, ways and activities of learning (Littlejohn & Pegler, 2007).

2.3.3 Theory of affordance

The extent to which a technology is used is related to its affordance. Technological affordance is a term in widespread use although its definition varies. It was originally posed by Gibson (1977) and related to the relationship between an object and the person or animal using it. Oliver (2005) describes this as the 'ecological interpretation'. Affordance was later developed by Norman (1988; Norman, 1999), who introduced the idea of *perceived* affordance, proposing that visual design may suggest a function, but for that function to be realised it must be perceived by the user. Thus:

> *"Affordance refers to the perceived and actual properties of the thing, primarily those fundamental properties that determine just how the thing could be used"p9 (Norman, 1988).*

In this context there is the cultural element of design in 'normality' and 'standardisation' so that for example we all see a round door handle and expect to be able to turn it. One only needs to see a child with a cardboard box to see that the affordance is not purely inherent in the object. Whilst an adult may use a cardboard box as a container a child may use it in play as a boat, a house etc.

The debate continues as to the meaning of affordance (Conole & Dyke, 2004; Norman, 1988; Oliver, 2005; Suthers, 2006). It has been applied from the designers' perspective (the intended use), the functionality approach (possible use) and from the user

perspective (perceived use) and / or from a context focus (social, technological, and educational), to name but a few. I have taken the term affordance not to be defined by the "interactionist" view (Gibson, 1977) as being inherent in the technology, but by the perceived view (Norman, 1988, 1999) as this represents the students' perspective (Boyle & Cook, 2004). This is also how it has been interpreted by much of the e-learning literature (Oliver, 2005).

The student will perceive affordance within the social context, as meanings cannot be specified in advance (Stahl, 2004a). There is a need to understand the natural mapping (Kirschner, Martens, & Strijbos, 2004) of how students use technology, and how this supports their collaborative learning (Suthers, 2006). Whilst the technologies may be designed to be used for collaboration, whether they are, depends on the perception of the user and utility to that particular person or group. Thus classifications of technologies and affordances (Bower, 2008; Conole & Dyke, 2004) that focus on 'natural' use, can only in part articulate their educational value; the practitioner still needs to balance this with an in depth knowledge of their students.

There are many factors that can impact on 'perceived affordance'. Kirkwood and Price (2005) in their review of survey data at the OU found a wide variation in students' use of technology according to subject area, age, gender and geographical location (Kirkwood & Price, 2005). There are very different IT abilities between students, some who are digital natives (Prensky, 2001) and others who have very limited IT skills (Sharpe, Benfield, Lessner et al., 2005).

Previous life experience will impact on the individual's choice, for example previous computer use may increase student's confidence (Ausburn, 2004) and hence engagement with technology. For example, students who had previous positive experience of learning through online discussions are more likely to participate when given the opportunity again (Ellis & Calvo, 2006), as are students who have a clear concept of how to participate online (Ellis, Marcus, & Taylor, 2005). Those who are net generation learners (Oblinger & Oblinger, 2005) may seek out new technology (JISC, 2007) and perceive affordance for learning in technology that is a normal part of their life.

The location of the students themselves will impact on the affordance (Littlejohn & Pegler, 2007). Some students who undertake paid employment and live off campus may perceive a greater affordance in online technology than those who can easily meet face-to-face. A survey at UH (Jefferies, Quadri, & Kornbrot 2006) found that mature students spent more time undertaking paid work than they did studying, so their ability to be on-campus to meet fellow students is restricted. Laurillard (1993) suggests a key aspect in using technology is the ability to continue learning conversations beyond the classroom. Littlejohn and Pedler (2007) suggest a classification of students by experience and location, from student A that is distant but has minimal technological experience to student D who is on-campus but is highly experienced. This is a pragmatic way of looking at students' technology use but assumes heterogeneity and that affordance comes from many factors including experience and location.

Classroom technology may provide an affordance for interaction both within the classroom and with the online environment. Whilst technology is becoming commonplace in our society, Laird and Kuh (2005) in their comprehensive and rigorous study of 350,000 students in the USA found that its use in education varied. The use of online technology (98%) for learning was more common place than the use of technology in the classroom (47%). They found that classroom engagement with technology is most strongly associated with collaborative learning.

The layout of a classroom will affect how the students interact (Beetham & Sharpe, 2007). There is a growing field of study in mobile computing but the focus of my study is online and in the classroom. The students in my study had access to a specially designed collaborative high technology room that has been developed to enhance collaborative learning by linking the online and classroom experiences. Traditionally the laptop is an individual interface (Milne, 2006). This limitation has in part been overcome in the BLU suite (LG3) by having a wireless mouse and keyboard that enables students to pass around the control of the computer and by the data projector that enables all of the students to see the output. LG3 also has furniture that supports collaboration. This room addresses one of the key issues in blended learning: the linkage of the virtual and physical worlds (Milne, 2006).

Affordance is a useful theory for understanding that the use of technology is multi-factorial and depends on the perception of the user. This is why there is a need to explore the user's (student's) perspective.

2.3.4 Models of e-learning for collaboration

The introduction of technology has resulted in new ways of looking at course design and learning (Laurillard, 1993; Salmon, 2000, 2002), although Mayes and de Freitas (2006) argue that:

> *"there are really no models of e-learning per se – only enhancement of models of learning" p.4.*

The conversational framework developed by Laurillard (1993), focuses more on the iterative dialogue between student and tutor rather than collaboration between learners, but her emphasis on the tutor's impact on communication is important. Salmon's (2002) model focuses on online dialogue and is perhaps the most reported model (Salmon, 2000, 2002). It has 5 stages:

1: Access and Motivation

2: Online socialisation

3: Information exchange

4: Knowledge construction

5: Development.

This model is focussed on online learning and is based on a constructivist approach. As such it offers a structure on which to sequence activities (Beetham & Sharpe, 2007). However, it has been criticised for viewing collaborative learning as a linear activity focussing on the learning of knowledge rather than the personal development of participants (Oldfield, 2008; Oldfield & Morse, 2007). Jefferies cited in Oldfield (2008)

proposes the addition of a preparation stage at the beginning and assessment and evaluation stage at the end. Moule (2007) criticises Salmon's model and proposes a "learning ladder". In this the bottom rungs focus on instructivist learning such as information sharing, continuing upwards through the interactive learning media, to the highest level, which is an online community of practice. She suggests that the ladder is not expected to be followed in a set sequence. Only the upper rungs of this ladder can be seen to relate to collaborative learning and some of the positioning of technologies is open to interpretation, for example, asynchronous discussion boards are above synchronous video conferencing. This contrasts with other research that suggest synchronous technology provides, greater affordance for collaboration (Hrastinski, 2008). However, a characteristic of this model that is pertinent to my study, are the sides of the ladder relate to:

- Group working
- Facilitation
- Longevity of engagement
- ICT access
- IT skills
- Technical support.

These are key issues for the tutor in designing collaborative learning experiences.

Oldfield has proposed a helical model that, whilst focussed on online learning, is more relevant to my research study as it looks at development from the view of repeated collaborative tasks. This model has four stages (Oldfield & Morse, 2007):

- **Define** the task
- **Distribute** share out the work
- **Deliver** complete the individual components and combine them
- **Debrief** reflection leading to next cycle.

However, this could be seen to be more cooperation than collaboration as there seems to be limited potential for co-construction. Oldfield (2008) goes on to develop this further, proposing five levels of interactivity:

Level 5: Collectedness

Level 4: Collaboration

Level 3: Cooperation

Level 2: Communication

Level 1: Connectedness.

The key point here is his suggestion that development of interdependence comes through repeated developmental cycles.

All of these models focus on the online learning environment and, as such, their relevance to the blended environment is yet to be fully explored. Complex learning tasks such as those used in PBL are difficult to document due to the granularity and the complexity of the activity (Littlejohn & Pegler, 2007). What these models all have in common is the increasing co-dependence and integration of learning between the participants in the group; that learning doesn't just relate to the technological application but also to the group dynamics.

2.3.5 Group factors

There are many 'group' factors that can impact on student's engagement and this is particularly relevant in HE where most of the students undertake some work in small groups. Some research suggests that, to create a more effective group, team roles (Belbin, 1981), personality and academic ability (Jaques, 1991; Tucker & Rollo, 2005) need to be considered, although these factors assume that the characteristics of the student are predetermined and cannot change. It is also suggested that group size (Gupta, 2004; Jaques, 1991) must be considered. There are many factors that can impact on group working: trust (Gulati, 2008), a sense of belonging to the group (Gulati, 2008), friendships, competitiveness, divergence within the group, psychological safety, cohesion (task and social) and interdependence (Van den Bossche, Gijselaers, Segers, & Kirschner, 2006). However, much of the research in this area has a behaviourist perspective.

Once the group has formed there are many theories of group development. Jaques (1991) describes thirteen, which all tend to describe a linear process - the development from a group of people to a performing team. Tuckerman and Jensen's theory (1977) suggests that after a team has formed, the team will go through a sequence of negotiation of roles described as storming (a process by which the whole team defines working relationships), norming and performing. For this to be effective there needs to be a process to encourage group development (Jaques, 1991; Tuckman & Jensen, 1977) and respect for others (Masschelein & Quaghebeur, 2005). It is suggested that groups that undertake specific team building tasks and discuss team formation activities will perform better (Lizzio & Wilson, 2008). Where students fail to participate equally in groups, with some

students doing more of the work, the less active students have been described as 'social loafers' (Latane, Williams, & Harkins, 1979) or 'silent participants' (Gulati, 2008) or 'lurkers' (Littlejohn & Pegler, 2007), this impacts on group dynamics.

Clouder et al (2008) explored the group dynamics and learning dynamics in undergraduate health students using an action research approach. In the analysis they used an adapted learning community grid based on the work of Davis and Dennings – see Table 2.

Table 2 Learning community grid adapted from Clouder et al (2008)

Learning Dynamics (LD)	**I'm OK, you're OK** High LD Low GD	**Tough Love** High LD High GD
	Fragmented by Technologies Low LD Low GD	**Summer holiday** Low LD High GD
		Group dynamics (GD)

The labels in bold capture the learning and group dynamics as stated in Clouder et al (2008).

They found that the group dynamics remained relatively stable between the online and face-to-face environments although individual student's engagement differed, between the two.

The role of the tutor can also impact on the degree of collaborative learning achieved, as the tutor is in a position of power (Gulati, 2008). There is a tension between the students' participation and self direction and the tutor's role. For example, in a case study by Dron et al (2004), the initial aim was to develop a blended course centred around dialogue. However, despite design and tutor training in the introduction of BL there were still many difficulties and problems. In response to these, tutors resorted back to instructional methods and there was a poor match between the blend and the students' expectations and needs. In another study by Ellis et al, (2006) when the students didn't participate in collaborative learning to their tutor's satisfaction, the tutors became more directive and put in additional individual tests. However, students did report collaborating and interacting with their peers. In Hughes and Daykin's study (2002), when tutors answered questions on a discussion site the students then ceased to discuss the topic. To counter this tutors delayed responses and this resulted in more peer collaboration.

Collaborative learning requires the tutor to be a facilitator rather than an instructor so that the students are encouraged to create learning conversations with each other. If this delicate balance is not achieved both students and lecturers may revert back to the transmission / didactic view of learning. For example in Ellis et al (2006) one student comment was:

> *"it's good to be able to talk (to the tutor) and make sure you are really learning what you are supposed to be learning" p249.*

The task and scaffolding will also impact on the student's participation in collaboration. Where the task was not aligned to the assessment, the online component was not seen as important by some students (Davies, Ramsey, Lindfield et al., 2005; Ellis, Goodyear, Prosser et al., 2006). These students then chose not to participate. There needs to be creation of a ZPD (Vygotsky, 1978), through the learning task itself, that must be achievable and the scaffolding provided in terms of the process (Mayes & de Freitas, 2006; Sharpe, Benfield, Lessner et al., 2005). The task must require a synthesised output (Paulus, 2005) if there is to be collaboration and needs to be meaningful to the students (Schellens & Valcke, 2005). Motivation is within the first stage in Salmon's model of online learning and students are motivated by assessment (Biggs, 2003). If choice is limited, the opportunity for the students to self-direct is reduced. This can interfere with group processes, increase cognitive load and disturb learning (Dillenbourg, 2000), as students cannot learn how they want. In summary, group factors may impact on students' collaboration and use of technology.

2.3.6 Health students' use of a blend for collaborative learning

In searching for research studies I have focussed on collaborative learning using a blend in the health discipline. Much of the following literature has been published since the start of my study in 2006/2007 and has been focussed on analysis of the online component.

Literature suggests that there are particular tensions between being a health professional and using technology for communication; computers came out of the science and engineering laboratories (Somekh, 1998). Kirkwood and Price (2005), in their review of survey data at the OU, found that health students' frequency of accessing IT was lower

than in other disciplines. A recent review specifically on health (Boulos & Wheeler, 2007), found that there was *"under-exploitation"* in this sector and that it relied on *"committed enthusiasts"*. A finding in several studies is that health students may not want to engage with technology for communication (Davies, Ramsey, Lindfield et al., 2005; Hughes & Daykin, 2002; Thornton & Alltree, 2002), and to date:

> *"relatively few healthcare organizations have taken up the tools and strategic advantages offered by Web 2.0."* p16 (Boulos & Wheeler, 2007)

Health students have chosen to undertake a profession where social interaction with patients is highly valued and is essentially a face-to-face activity. The use of problem based learning or modified versions are more prevalent in health education and as such require a complex blend (Littlejohn & Pegler, 2007). Where blended learning has been introduced into collaborative learning it is often in providing resources such as a virtual community such as Wessex Bay, (Quinney, Hutchings, & Scammell, 2008) or web-based resource enriched scenarios (Gibbon & Currie, 2008). The majority of the literature has been published recently and there is no specific literature on using classroom technology in the health discipline for collaboration.

Collaboration online in blended courses

Online technologies such as discussion sites have been used for collaborative learning with health students, although there is little evidence that students have used them for co-construction of knowledge.

Davies et al (2005) undertook what is perhaps best described as a case study, on first year UK physiotherapy students using a blended environment. The students were allocated to a number of groups for learning and provided with materials via a VLE. This was evaluated by a questionnaire given to 100 students (response rate not given) and staff observation. The students viewed the video clips but there were difficulties in getting the students to engage with discussion online. The authors presumed that this was due to technological difficulties in particular the skills of the students and so ran IT clinics for them. But despite this support some students still didn't engage online. They then introduced an individual test to ensure that the students had the relevant knowledge. The assessment was poorly aligned as the group activity was not assessed. They acknowledge the difficulty of achieving collaboration and suggest that this in part relates to:

> *"students with different educational and life experiences, which may have shaped their different attitudes towards and involvement with these peer-supported activities" p625 (Davies, Ramsey, Lindfield et al., 2005).*

The authors don't detail any activities to enable this process and the students were moved into different groups during the process so they may have not had time to develop as a group. It is implied by the authors that students who worked from home or participated asynchronously were participating unequally, with some resentment that students were *"not pulling their weight"*. The authors give no details of the level or nature of the online engagement, but it is inferred that there was limited activity online.

Hughes and Daykin's study (2002) was based on third year nursing students (n=220), spread over four sites. Online "learning methods" were used for group projects, along with lectures and workshops. Although subjects were all undergraduate students, they were not all on the same campus and the research design is not stated. Data included focus groups where the sampling was purposive (including students who had the most activity, the mean and the least) and content analysis of communication. Analysis of the communication on the discussion is limited as the students may have been using other mediums e.g. text messaging, not available to the authors. The students did use the asynchronous discussions online but more for clarification from the module tutor than interactions with their peers. They tended to interact more if the tutor didn't respond and a tutor response tended to bring a discussion to an end. The task, to critique each other's essays, seemed to have impeded discussion but whether this was the task or the medium online was unclear. The only online discussion of note was on the main module site, accessed by the whole cohort and not about the topic. The authors suggest that perhaps actions by the tutors didn't help the development of collaborative learning and state that:

> *"there was no evidence to suggest they had developed a constructivist approach to learning" p223 (online).*

In a more recent study by Curren et al (2008) 520 undergraduate students participated in asynchronous computer mediated discussions and face-to-face discussions, using a case based approach. The students were very satisfied with the case based approach, but unanimously reported greater satisfaction with face-to-face than online communication,

especially in terms of *"professional learning"* p433. However being a quantitative study there was no rich data to explore this in greater depth.

Two studies suggest that training of students to use the technology is an important issue (Davies, Ramsey, Lindfield et al., 2005; Peacock & Hooper, 2007). The authors imply that this failure to use the discussion boards was linked to poor IT skills and access issues:

> *–"varied IT skills discouraged students from building effective learning communities" p627.*

However, even following technology tutorials some students still did not participate, suggesting that participation was not purely related to technological competence.

Successful use of online asynchronous discussions is reported by Clouder et al (2008). This involved undergraduate physiotherapy students. There were key points to this study:

- the students had socialised for 18 months on campus
- the online component took place when the students were off campus on placement (i.e. face-to-face was not an option)
- they had a dedicated *"team of online tutors"* who knew the students
- the groups were of approximately 20 students
- there was considerable facilitation, especially where the students were experiencing difficulties

The task was aimed at reflection on practice. Clouder at al (2008) suggests that the initial motivation of the students to engage online was social and from this developed

collaborative learning. Some groups who are described as having high learning and positive group dynamics did discuss online with high volumes of postings but others did not. The authors suggest the engagement and interaction of individual students can alter when interaction moves from face-to-face to online, although group dynamics remained relatively stable.

In summary there is little to support the view that asynchronous discussion sites enhance collaborative learning for health undergraduate students. To date the prevailing assumption has been that this is due to technological problems and lack of training although there is some suggestion that the issue maybe more complex. Ellaway (2007) considers the nature of the practice domain, within the digital age. She notes that e-learning in practice courses focus around acquisition, with most reusable learning objects (RLOs) for medical education being didactic and instructional. She accepts that for health education the primary focus is the patient and suggests that 'domain-specific' design may be required in practice courses.

There is one study that has evaluated the use of a synchronous voice based technology with health students and this has only recently been published (Carbonaro, King, Taylor, Satzinger, Snart, & Drummond, 2008; King, Taylor, Satzinger, Carbonaro, & Greidanus, 2008). The students from different disciplines used WebCT and Elluminate (www.elluminate.com). The latter is a synchronous virtual voice based technology; it was used to replace face-to-face sessions creating a course that had a 70% online component.

The 24 students in four teams were volunteers and as such wanted to try the online approach. Some students felt that they had to:

"Work harder to develop as a team in the online setting" p4.

It was noted that using the online environment became easier with experience. The students felt the online communication was difficult for example when talking about the patient interview:

"you miss out doing it online[...]... we didn't see the person and we didn't get any response" p4

With Elluminate they found the "turn taking" in an online conversation a challenge and that they tended to interrupt each other. However the students did participate and concluded that using this technology would be part of communication in the future.

Access and availability

Access and availability of technology may well impact on the students' ability to participate collaboratively. Some universities have taken the stance that students are required to access computing facilities e.g. OU (Kirkwood & Price, 2005) whilst others such as UH, have provided quality IT through learning resource centres. Access has been reported as an issue for students working from home (Davies, Ramsey, Lindfield et al., 2005; Thornton & Alltree, 2002). Davies et al (2005) found network outages limited access and the authors also suggest that some students could not afford technology, although they provide no clear evidence to substantiate this claim. Some of the students in King et al's (2008) study described the biggest frustration as being when they were *"kicked out"* of the Elluminate sessions. Ward and Moule (2007) used focus groups of 16 health

students, to explore ICT use and found access was a major issue. The students had to access computers in the hospital library. This paper was accepted in 2006, and they acknowledge that the situation is changing rapidly. Despite access issues, students who live off campus and have domestic responsibilities, may choose to use technology because it is their primary means of communication with their learning group (Aspen & Helm, 2004). Where there is not an option to meet face-to-face being able to communicate offsite is valued by students (King, Taylor, Satzinger et al., 2008). Although some students recognise that the time factor of setting up the laptop, logging in etc needs to be taken into account (Peacock & Hooper, 2007).

Online compared to face-to-face

In a study by Davies et al (2005), students chose to meet face-to-face when there was conflict in the team rather than use online methods. In another study, the task was criticising other students' essays but there was a reluctance to do this online (Hughes & Daykin, 2002). These students tended to use the online to post information (e.g. web sites that they had found) but frequently made statements such as 'talk to you soon', which the authors suggest led to face–to-face meetings. The authors suggest that this might be due to online communication leaving a permanent record and the absence of non verbal means of communication in the online text based discussions. The students' perception was that face-to-face communication was necessary to produce 'good quality' work. Davies et al (2005) suggests that the face-to-face element was essential to encourage active participation and engagement. However in contrast, King et al (2008), suggest that some students found it easier to disagree online using Elluminate as they could challenge

without seeing the reaction, and it was therefore less confrontational, although they still found it difficult to make decisions online.

Peacock and Hooper (2008) carried out a study comparing the use of the online environment by an undergraduate and postgraduate group of health students (although this study did not focus on collaborative learning). They found a marked difference between on-campus undergraduates, who felt online discussions were not appropriate and preferred face-to-face meetings, compared to the off site postgraduate students who were very positive about the online discussions. The postgraduate students saw that the online environment could be used for communication whereas the undergraduate students saw the VLE more as a resource. The undergraduate students said:

> *"online discussions were not appropriate since their need to be in contact was fulfilled via face to face, often unstructured meetings with peers and tutors" p22*

It should be noted that, whilst the postgraduate students valued the online discussion sites, it was mainly valued for tutor contact and they wanted the tutor to check the online discussions.

This permanent record left in online text based discussions, available for all to view, can be inhibiting to the students as it can result in them perceiving that there is surveillance of their learning (Gulati, 2008). Many students come to university using many free open access software collaborative technologies such as MSN and Facebook (Jefferies, Quadri,

& Kornbrot 2006), that are not open to viewing by the tutor. The students can see the potential use of discussion boards as a means of communicating with peers but they want recognition if they do it, suggesting that it was not natural to them (Ward & Moule, 2007).

Technology and practice – culture of Health

Several studies have found that some health students are resistant to engaging in using online technology for communication and the suggestion is that this is linked in some way to the culture of the profession.

Students in Davies et al's (2005) study expressed a resistance to engaging in *'e-learning activity'* as they could not see how this related to being enrolled on a professional clinical degree, and the authors admit that they perhaps:

"failed to take into account the ethos or 'culture' of this kind of course" p623.

In Hughes and Daykin's study the main discussion that took place online was not about the course topics but about the use of IT in nursing, with some students saying that they didn't see the need to engage in IT as a nurse. This was also expressed in terms of their own personal identity:

"remarks about IT not being 'their thing'" (Hughes & Daykin, 2002 p219)

However these studies were carried out in 2002 and 2005 and the situation could be changing although this professional questioning of the role of It in health education has been reported in other studies (Alltree & Thornton, 2004; Peacock & Hooper, 2008).

Sandars et al (2007) discusses three case studies of implementing online learning with a group of networked professionals. These were postgraduate professionals (GPs) who had chosen to join this network. The technology that they used was a discussion board; a frustration was the *"lack of postings and interaction"*p13. They state that:

> *"This study has highlighted the overall low level of activity and this would appear to be because implementation has not been based on an understanding of the healthcare context" p.9.*

This cultural and contextual aspect could explain the anxiety expressed by students where they have been directed to use the online technology. In Hughes and Daykin's study (2002) the introduction of online learning initially caused anxiety in the students, which the authors suggest was in part due to their uncertainty *"of what was expected of them"*p.219. In Davies et al's study (2005) students were approached by a member of staff if they didn't log in once a week, so their choice was restricted as they were expected to participate in a given way. Gulati (2008) discusses how there is a tendency in HE for online participation to be made compulsory, negating the natural use of the technology (although obviously face-to-face classroom activity is also sometimes compulsory).

However, the relationship between technology use and the health discipline does appear to be changing. This can be seen in more recent papers where health students were generally positive about the technology (Ward & Moule, 2007). So, whilst the students in King's (2008) study found the technology "challenging", they did recognize the need for undertaking this experience as:

> *"they saw it as the way of the future" p5* (King, Taylor, Satzinger et al., 2008).

Although it is important to note that they were not given a choice.

To summarise, there is evidence to suggest that students' use of technology for collaboration on health courses requires greater exploration. A particular area for study is the student's perspective on collaborative learning. In my study I intended to contribute to the knowledge of this by giving the students a technology rich environment both in the classroom and online, organising them into groups based on their technology preference and then exploring the student experience.

2.4 Choice

The students in my study were put into groups based on their expressed choice as to what technologies' they wanted to use. I will discuss this topic under the themes of autonomy and identity.

2.4.1 Autonomous learners

There are many theories that are associated with choice including motivation (Herzberg, 1966; Maslow, 1987), self determination theory (Ryan & Deci, 2000), self-efficacy

(Bandura, 1995) locus of control (Jarvela, Hakkinen, Arvaja, & Leinonen, 2004; Rotter, 1954), and empowerment (based on the ideas of Weber, 1946) to name but a few. These theories suggest that giving a choice will result in greater motivation, prompting students to take more responsibility for their learning and giving them a more internal locus of control. This takes place through a process of development such that the individual becomes more autonomous.

HE institutions see their role as creating autonomous and independent learners, enabling the student to self–actualise (Maslow, 1987) and control their world in a way that will be intrinsically rewarding and satisfying (Hughes, 1998). This requires the student to be able to make choices. It could be suggested that blended learning depends on the precept that the learner can self direct in their choices of media (Beetham & Sharpe, 2007; Sadler-Smith & Smith, 2004; Sharpe, Benfield, Lessner et al., 2005). It is suggested that HE learners desire this autonomy and self direction, have an affinity for real life learning and have expectations for options and personal choice (Ausburn, 2004).

With the development of technology and the internet, choice is now an important issue with some students being very "Net savvy"(Lorenzo, Oblinger, & Dziuban, 2006). Students expect technology to be part of the HE educational experience but, although they see technology as important, they strongly value face-to-face interaction (JISC, 2007). They are able to evaluate how technology can help them and only 5% of direct entrant students are not using social network sites (JISC, 2007). Although students' abilities and

desire to use technology remain diverse (Lorenzo, Oblinger, & Dziuban, 2006), giving students choice enables them to be more empowered.

Empowerment and autonomy are becoming important philosophies in the NHS, where there is an emphasis on giving patients choice. This is reflected in many services where the paternalistic approach of the medical model of healthcare (where the doctor directs patient treatment) has been replaced by a bio-psychosocial approach (where the patients decide on their treatment in partnership with the healthcare team, considering the psychological and social aspects as well as the biological illness). So, for students to be empowered themselves in making choices reflects the professional values of the modern NHS. In practice environments the need for learner autonomy is:

> *"ill suited to over structured designs" p163.*(Ellaway, 2007)

For students to be able to make choices about their learning is professionally relevant. However, the curriculum content is predetermined by the professional bodies (the Chartered Society of Physiotherapy and the Healthcare Professions Council) and laid out in detailed outcomes. Students have limited flexibility to choose 'what' is learned but there is an opportunity to give the students choice of 'how' they learn. In this study, students were given a choice over the blend they use for collaborative learning.

2.4.2 Identity

In the positivist paradigm, terms such as personality, character and nature, are used to describe individuals but are, *"tainted"* (Sfard & Prusak, 2005) with the deterministic biological view. More recently 'identity' has become *"perfect for the task"* (Sfard &

Prusak, 2005, p.15) of creating an understanding of how individuals act and take part in social life. Identity has been defined in many ways, in part dependant on the perspective of the discipline adopting the term.

The identity of the students will be fundamental to the choice that they make. Identity can be seen as "a way of being in the world" (Wenger, 1998 p.151) - 'becoming' who we are within the social environment in which the individual is functioning. Identity is dynamic. Bruner (1990) uses the term 'self' to suggest that this is not static and is defined:

"both by the individual and by the culture in which he or she participates" (Bruner, 1990 p116).

The individual's identity is constructed, by what Sfard and Prusak (2005) describe as "stories". Thus what people 'really think' is replaced by the stories that they tell. What a student may say about themselves is thus their authorship of their identity and what they say will depend on the recipient and context (Sfard & Prusak, 2005) in which the story is told.

However a student's identity will always be constrained by the context. There are critics that suggest that giving choice to the student is simply teaching the student to behave in a certain way (Masschelein & Quaghebeur, 2005). In a sense, their agency is always restricted. Masschelein and Quaghbeur (2005) base their argument on Michael Foucault's work on governmentality, suggesting that in order for the student to act they have to

accept certain aspects of their identity as a participant. In collaborative learning this is often formalised into a learning contract (Lemieux, 2001) or script (Dillenbourg, 2000). Tutors and student handbooks tell a story as to what the students are expected to 'be', what Sfard and Prusak (2005) describe as a *"designated identity"*, as these represent the institutional power they may be an influential voice on the student's actions.

So, whilst the student has a choice, this will be constrained by the context in which that choice is made and by the student's agency within that context.

2.5 Summary of Literature review

Collaborative learning is the shared process of creating meaning through co-construction. In a blended environment research into collaborative learning is a rapidly developing field, with a large volume of literature being published at the current time.

In HE it tends to be practiced by small groups of students undertaking authentic tasks to produce a collaborative output. There are many learning theories that can be used to analyse collaborative learning but those focusing on social interaction (social constructivism and socio-cultural theory) are most relevant. In HE the collaborative learning group (small group of students) is perhaps more relevant than the concept of Community of Practice, although the latter is relevant if students are viewed in the professional context as legitimate peripheral participants of their profession. Collaborative learning is particularly relevant to health students as health practice requires collaborative working for effective patient care.

Blended learning, combining face-to-face and online technologies is becoming an important development in HE. It can potentially give flexibility and opportunities for dialogue beyond the face-to-face classroom. Currently there is considerable diversity in the students' experience of technology and, at the start of the study; there was limited research from the students' perspective. The use of technology by students depends on perceived affordance of the technology and the context. The affordance of a technology is situated within a context and will be multi factorial including such issues as past life experience, location, and functionality of the technology. Classroom technology can enable the linking of face-to-face and the online environment and where supported by classroom architecture, can provide opportunities for collaboration.

There are many models of collaborative learning, many focused on the online context. Important aspects included in such models are social presence, access, motivation, the role of the tutor and the process of undertaking the task.

From the current research there appears to be limited uptake by health students of the online environment for collaborative learning, in particular by undergraduates. It has been suggested that this could be related to technological competence, training, access and availability, the quality of the communication and the culture of healthcare. In particular there is, to date, little evidence to suggest that on-campus undergraduate health students will use asynchronous discussion sites for co-construction of knowledge.

In undergraduate health courses in higher education the tutors' intention is to produce autonomous learners who are fit for professional practice. Making choices is an important aspect of personal development and reflects the individual identity and agency within the context in which they are studying.

The aim of this study is to explore the students' experience of choosing and using a blend for collaborative learning where the students have been allocated to groups based on their individual preference of blend. The basis of the student's choice of blend and the impact of this on their collaborative learning is fundamental to our understanding of the student perspective because:

> *"We can spend hours designing and developing blended learning environments, but if we do not understand how students think about and approach their learning in these environments, then much effort and opportunity for quality learning will be wasted."* (Ellis, Marcus, & Taylor, 2005 p251).

Chapter 3. Methods of Inquiry - investigating the research questions

3.1 Introduction

This study sought to gain a rich understanding of the relationship of the students' choice of technology for collaborative learning in undertaking weekly tasks during a third year module. There are many factors that may influence a student's choice of blend to use in their weekly tasks, but when students are required to work collaboratively there needs to be some consensus within the group as to the blend for the students to work effectively. There was a difficulty in the studied cohort as students had very varied experiences and knowledge of technology and differing personal preferences. The students were therefore organised into groups based on their expressed preference. The students were on campus and so had a choice between meeting face-to-face and working online. The decisions students make on how to work and what technology to use and the impact of this on their learning is complex and poorly defined:

> *"we still know far too little about what happens in the day to day practice of teaching and learning".p170 (Jones, 2007)*

In this section I will discuss the reasoning behind my chosen research design. The section will also cover the data collection tools, ethical issues encountered, the recruitment of students and the data analysis.

3.2 Summary of Research Stance

My profession, physiotherapy, has in common with other health professions, a longstanding history of valuing the positivist paradigm, with the multi-centre randomised controlled study deemed to be the "gold standard" (Harbour & Miller, 2001). However through my practice and studying for this EdD, I have come to realise the limitations of this perspective. My understanding of knowledge has changed to the view that it is socially constructed. This led me to conclude that the focus of this study, which is the student's experience, would be more appropriately investigated by an interpretive perspective. I will discuss and justify this stance further through this section but the stance is summarised in Table 3.

There are numerous classifications of paradigms, approaches, perspectives, and methodologies of research (Crotty, 1998; French, Reynolds, & Swain, 2001; Hammersley, 1993; Henwood & Pidgeon, 1993; Mackenzie & Knipe, 2006; Robson, 1993; Sim & Wright, 2000). I have drawn on the hierarchy of four levels as defined by Crotty (1998), as this fitted most closely with my own perspective, although what is a methodology or a method is disputed in the literature (Mackenzie & Knipe, 2006).

Table 3 Summary of the stance taken in this study

Ontology /Epistemology	Relativism /Social constructivism
Theoretical perspective	Interpretivist
Methodology	Mixed methodology
Methods	Case study design

3.2.1 Ontology and Epistemology

Ontology is the study and understanding of existence. This study takes a view that this is 'relativist' (Eisner, 1993); there are things that we can be more certain of than others and the way in which we know things, the epistemology (Wheeler, 2006), is socially constructed. By investigating the experiences of different undergraduate students, I am assuming that their experiences of learning in groups will differ and will be socially constructed by their own experiences.

The perspective of the scientific positivist tradition has for some time been dominant in:

> *"shaping expectations of what constitutes 'proper', 'valid' and 'worthwhile' research."* (Bassey, 1999).

However, I have rejected the positivist stance for this study for the following reasons. The positivist approach to research assumes that there are facts and that there is reality outside the mind (Crotty, 1998), often described as 'naïve realism'(Lincoln & Guba, 2000) and that there is an objective 'truth'. The positivist stance is that there is a reality that can be captured and studied (Denzin & Lincoln, 1998) which presupposes we know what reality is. How can there be objective facts about experience? To know how relatively true a piece of knowledge is we must know what reality is. If we do not know what reality is, everything we know must be a construction (Philips, 1993). We do not construct our 'perceived reality' in isolation but within a social context (Mackenzie & Knipe, 2006; Schwandt, 2000). The student's experience is but a story from that individual's perspective.

The participants in this study were physiotherapy students. In general, health is a positivist discipline (Rolfe, 2001) that values quantitative research and seeks the 'truth', as seen in the hierarchy of evidence (Harbour & Miller, 2001) on which 'worthiness' can be judged (Figure 6). This caused many difficulties, in obtaining ethical approval, and for recruitment. The socially constructed view of qualitative research was seen by some colleagues as unworthy and by some potential participants as unethical (sees 3.5.2).

Figure 6 The hierarchy of evidence (Harbour & Miller, 2001)

Best Evidence
Systematic reviews and meta-analyses of random controlled trials
Randomised controlled trials
Non-randomised intervention studies
Observational studies
Non-experimental studies
Expert opinion

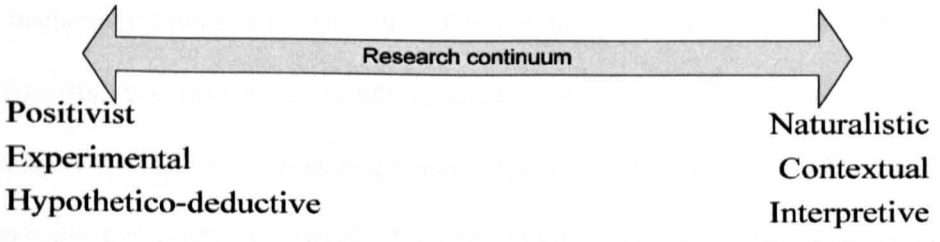
Since the 1960s the objective scientific model has been increasingly rejected for educational research (Mackenzie & Knipe, 2006). The nature of social change makes education particularly sensitive to being historically situated (Carr, 1987), with educational practice an inherently complex and situated activity (Hirst, 1987). The technology available and the student's lived experiences are unique, constantly changing and so their experience is a narrative, a story told from a perspective - it is 'created'.

When the students tell their story, they are influenced by many factors: the context, who they tell, and the social situation. Social constructivism views knowledge as being the result of social interaction and language usage, leading to a social consensus (Elkind, 2005). Social constructivism is the concept that all knowledge is contingent on human beings and the interactions between them (Crotty, 1998). The knowledge of a student's experience will be the result of complex human interactions in the creation of meaning, so it will be socially constructed.

3.2.2 Theoretical perspectives

If knowledge of the student's experience is all relative and is socially constructed then it needs to be researched using a theoretical perspective that embraces this epistemology. Research has tended to adopt two main theoretical perspectives. These are very different and in some senses opposing stances which can be seen to be two poles of a continuum (French, Reynolds, & Swain, 2001; Henwood & Pidgeon, 1993; Sim & Wright, 2000) in which different terminology is used (Figure 7).

Figure 7 Research continuum



The positivist approach tends to favour research where an experimental condition is created and a hypothesis tested; the emphasis is on controlling of the variables. In the

experimental design a *priori* theory forms the question of the study whereas, in an interpretive perspective, the theory is developed from the data (Crotty, 1998; Henwood & Pidgeon, 1993; Sim & Wright, 2000; Stake, 2000). I wanted to understand and interpret the experience of students, not to prove a hypothesis, and so in common with socially centred research I would argue that no *priori* theory can possibly encompass all of the complexities (Thorne, Kirkham, & O'Flynn-Magee, 2004). This study will take an interpretivist view; a perspective that has developed historically from the critique of the positivist view (Henwood & Pidgeon, 1993) and is often described as postmodernist (Lincoln & Guba, 2000). As an interpretivist researcher I will interpret the data in light of my own lived experience, the reader will then interpret my findings and hence while our interpretations may be similar they will not be the same (Bassey, 1999). As the researcher I will interpret the students' experience using both their own stories (interview and questionnaires) and analysis of their actions and behaviour (observation and monitoring data).

Using the interpretivist perspective the researcher acknowledges her own role in the process, thus I seek to be open and transparent (Stake, 2000) inevitably accepting that as a researcher I have my own 'voice' (Lincoln & Guba, 2000). Essential in this stance is reflexivity, the researcher needs to make her/his 'enquiring mind' open to scrutiny (Robson, 1993), to acknowledge and understand her/his own values and interests, decisions and rationales (Lincoln & Guba, 2000). I have integrated reflexivity throughout this chapter and also refer the reader to my personal reflexivity on the topics (Chapter 7) on which the reader can reflect on my interpretation.

3.2.3 Methodology

Crotty (1998) views methodology as a choice between quantitative and qualitative. Given the view that knowledge is socially constructed I sought to interpret the students' experience in a real, authentic learning situation. I wanted to use a methodology that could embrace that experience, both on and offline. The data from online tends to be numeric and quantitative in nature. In order to interpret their experience I wanted to have rich data from different perspectives and sources and this led me to choose a mixed methodology. On reflection this was compatible with the nature of the investigation but also perhaps with my transition from a factual quantitative positivist researcher to an interpretivist. The underlying difference is that at an epistemological and theoretical level commensurability between positivist and post-positivist worlds is not feasible, but at the level of methodology mixed methods makes perfect sense (Lincoln & Guba, 2000; Mackenzie & Knipe, 2006).

'Purist' researchers take individual methodologies and follow their originators' methods dogmatically. In addition, the linking of quantitative and qualitative methods to the poles of the continuum has led some researchers to see the choice of methods as either quantitative or qualitative (Hammersley, 1998; Lincoln & Guba, 2000). I have taken the pragmatic stance advocated by case study researchers (Yin, 2002) that all methodologies can be used given that they are focussed on investigation of the topic and are analysed within the avowed epistemology.

Within the mixed methodology I used a case study design method. This is a case study of one particular module, cohort and historical situation. It is unique. By using multiple sources of evidence the interpretations are contextualised (Thorne, Kirkham, & O'Flynn-Magee, 2004), and for this reason multiple sources are viewed positively in case study design (Yin, 2002). What could be considered as quantitative data, such as StudyNet monitoring data (log-ins and online technologies used), was used to support the more qualitative data collection strategies of interviews. Initially I was more focussed on a mixed methodology to embrace both on and offline data sources. As the study developed, the richness of the qualitative data took prominence in terms of the students' experience whilst the quantitative data was invaluable in determining which technologies the students actually used.

3.2.4 Method

Case study design has been advocated by Bassey (1999) as the 'prime' strategy for the development of educational theory, where the focus is on real life and where the context influences the matter under investigation. Although considered weak evidence by those authors from a positivist theoretical perspective, this methodology is used extensively in social science and practice based fields (Robson, 1993; Stake, 2000, 2006). This is due to the ability of this design to embrace qualitative and quantitative data collection (Stake, 2000) and to deal with the complexities of real situations while enabling researchers to share knowledge (Yin, 2002). The unique situation and questions led to a case study design exploring in depth a 'bounded' situation (Stake, 2000). The technology available to the students in this study is unique. StudyNet is a unique MLE like no other university and the physiotherapy students in this cohort have experienced its use over their previous

two years. LG3 is a unique room and although other universities have collaborative areas few have facilities equal to those in this room. At the start of this study there was very limited research into physiotherapy or even health students' experience in a blended learning environment. A case study to explore a bounded situation enables emergent issues to be identified.

Yin (2002), Bassey (1999), and Stake (2000; Stake, 2006) are major authors in the use of case study, although Yin in his writings has taken a rather positivist view of the case study design (Bassey, 1999). Bassey (1999) focuses on case study in an educational context but perhaps because he is more strongly interpretive in his stance, whilst discussing many views, terminologies and approaches, he struggles to bring these into an overarching framework. Yin (2002) embraces a mixed methodology.

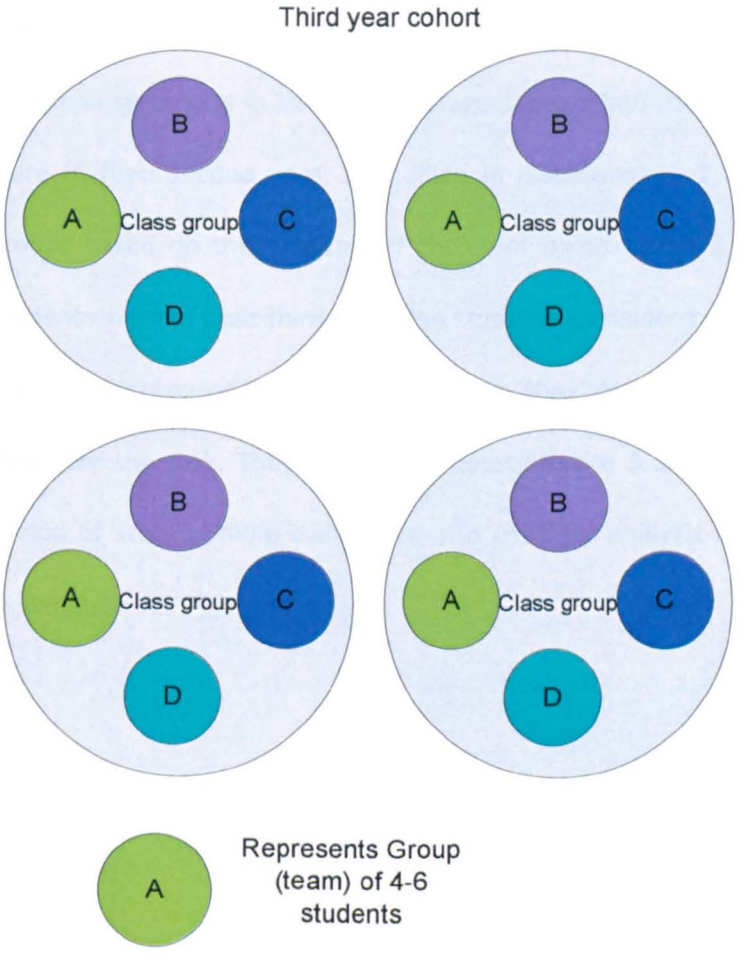
The main element within this case study is exploratory - the question 'what', although developing on from the what was the students experience there is some exploration of the explanatory - 'how' and 'why' (Yin, 2002). It could be seen as an intrinsic case study (Stake, 2000), aiming to produce a 'thick description' of the case:

> *"so that readers can vicariously experience these happenings and draw conclusions"* (Stake, 2000).

It has clear boundaries; one particular cohort was studied, with the focus on their experience of choosing and using technology for collaboration, for one module (Advancing Practice) in which they undertook weekly collaborative tasks. Although overall the project is a case study, within the case there are groups and individual students linked

by the module and undertaking specified learning tasks. Because the groups were compared this could also be described as a collective case study (Silverman, 2005). This is shown in Figure 8, which shows how the different groups could be seen as cases.

Figure 8 Diagram showing the class groups and small groups (teams)



3.3 Data collection tools

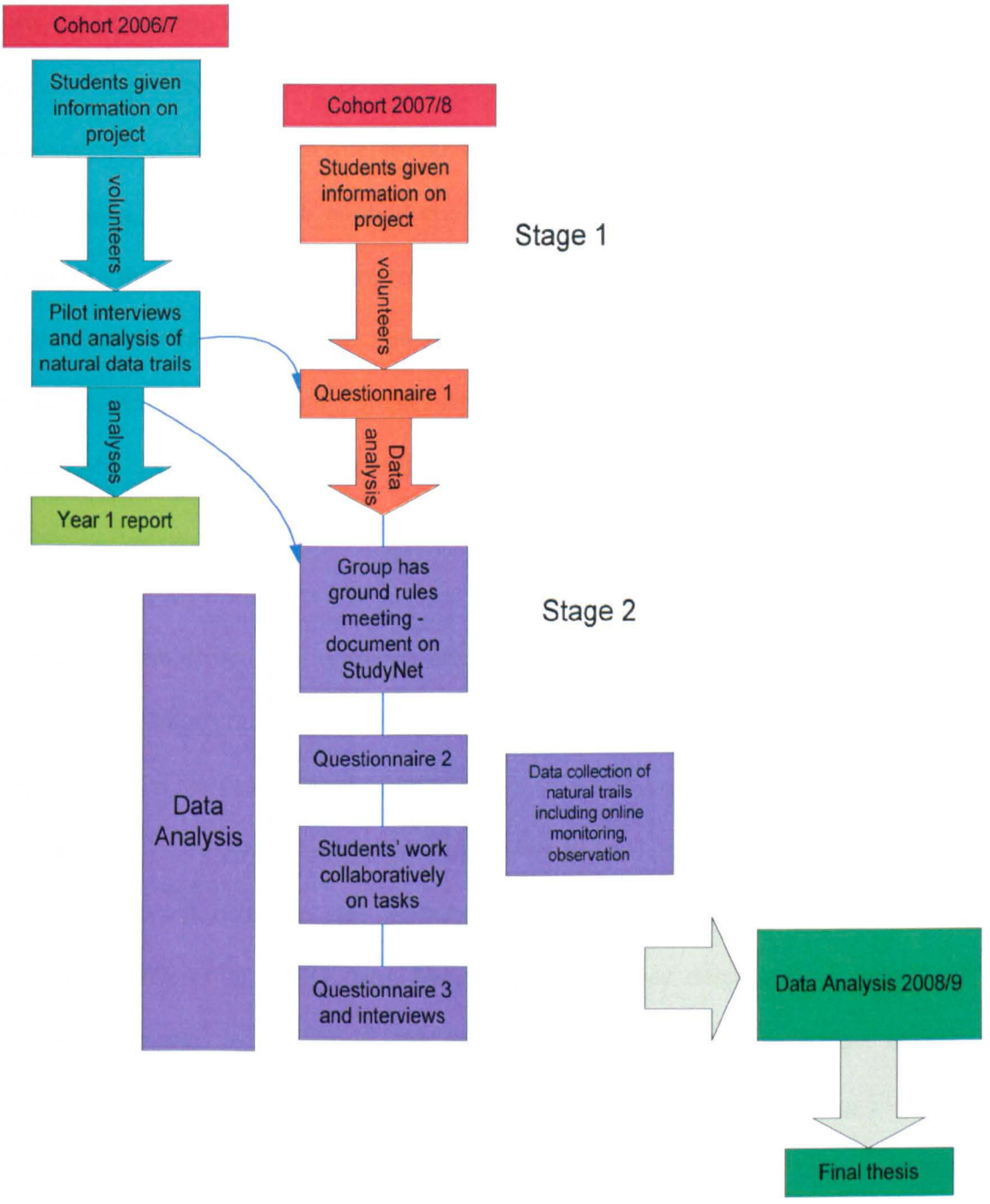
The data collection tools that can be used in a case study are numerous. Yin (2002) suggests six sources of evidence and notes that a good case study will collect *"as many sources as possible"* p85 (Yin, 2002). The key is to seek rich data focussed on the aspect of study - students' choice and use of technology for collaborative learning. A chronology of

data collection is provided and for each tool used, the rationale and implementation is given. Data management and analysis will be covered in section 3.6.

3.3.1 Chronology of data collection

This study used a mixed methodology case study design. A pilot study was conducted on the third year cohort of 2006/7 and included interviews and analysis of online activity. The main study was in two stages. Stage 1 was when the students in the 2007/8 cohort were in their second year; they filled in questionnaire 1 and were then allocated to groups based on their expressed choice of blend. Stage 2 took place when the same students were in their third year. The students completed questionnaire 2 after they had filled in the ground rules contract where they decide what blend they would use to complete the task. They completed questionnaire 3 and interviews at the end of the period of study. Online trails were also used for analysis in stage 2. For diagrammatic explanation see Figure 9.

Figure 9 Research activities and stages



3.3.2 Interviews

Interviews were the primary data collection tool. Interviews were chosen as they provide rich data (Robson, 1993), enable students to tell their own experience and allow *"a dynamic and meaning-making occasion"* (Holstein & Gubrium, 2004). The knowledge is co-constructed between the interviewer and interviewee. However, I was concerned about using interviews as a method due to my position of power in relation to the students I therefore used the pilot to explore this tool. I had considered audio or video diaries but my concern was that this would favour the more technologically focussed students. Also there had been a project using these methods at UH for the previous two years (Jefferies, Quadri, & Kornbrot 2006) and when I started this study there had been no health student volunteers.

I chose a semi-structured interview approach (Fielding & Thomas, 2001). A more structured approach tends to be used where there is an initial hypothesis, rather than an exploration. On the year 1 OU residential school, a session explored the use of artefacts as triggers in interviews, to enable the interviewee to have greater control and to avoid direct questioning. I chose to use artefacts as triggers for the interview rather than set questions. Crilly et al (2006) used diagrams in what they describe as a 'graphical elicitation process' in interviews with industrial designers. This was chosen as the participants were known to have a well-developed graphic sensibility. Diagrams are frequently used in physiotherapy clinical practice. The diagrams and word cards made this interview different from a 'viva' assessment situation with set questions and correct

answers. This was intended to put the students at ease. By using the diagram and single words students were able to initiate and direct the conversation.

I chose to use artefacts to encourage the students to tell the story of how they worked, hoping that they would focus on the artefacts and to give them some control over the interview so they could work through the story at a pace they wanted. The artefacts used were a picture of the week (see Figure 10), and cards with three topic areas (Figure 11). In the pilot only the cards were used but even this led to the students doing the majority of the talking. Several students actually pointed at and talked to the cards such that I became almost an observer as they reflected and worked through telling a story of their experience using the artefacts as triggers for dialogue.

Figure 10 Diagram of the Week

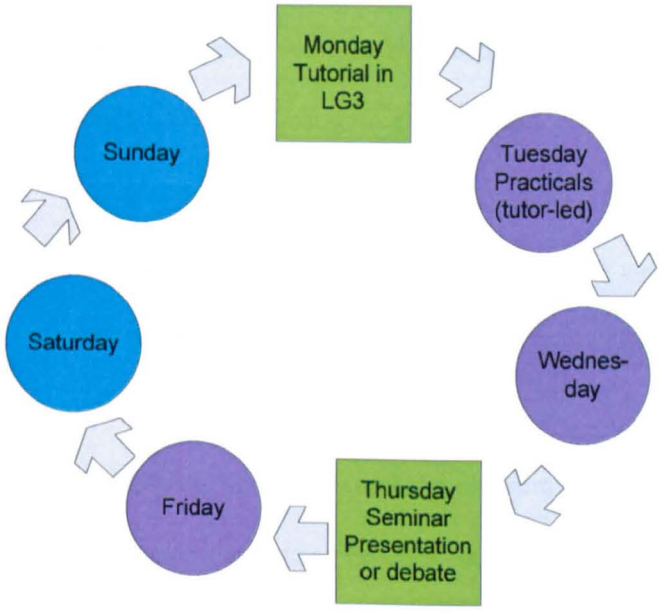
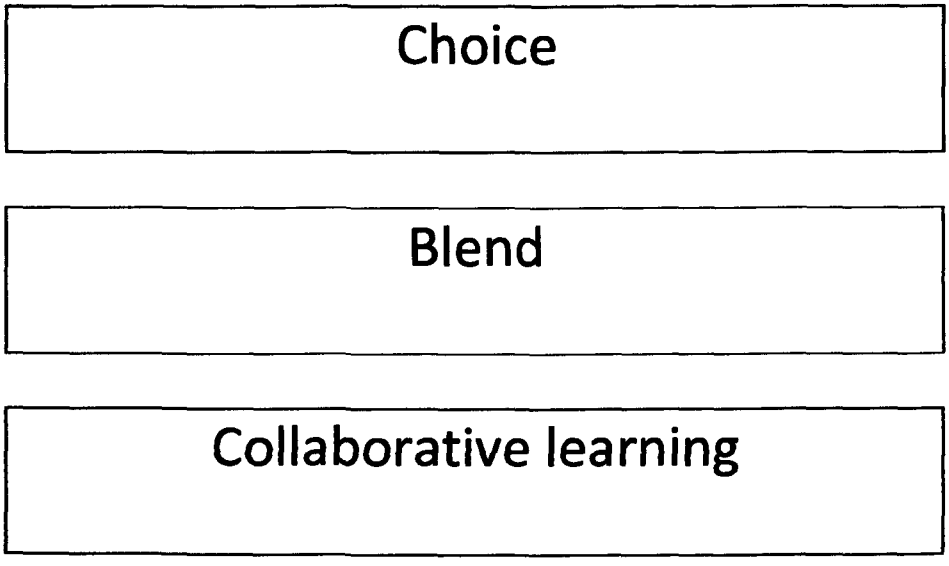


Figure 11 Cards used in interviews (about 20% of size)



The interviews were structured according to good practice (Robson, 1993; Sim & Wright, 2000):

- Introduction - Prior to the recording starting I explained to the students again what I was investigating (they had previously received written information). I explained to them about confidentiality, that I wasn't marking third year work and I tried to make them feel that they could speak freely and ask questions. I then checked that they were willing to continue and, if so, asked them to complete the consent form.
- Warm-up – for this I used the diagram of the week and asked them to talk through a week in Advancing Practice explaining how they worked.
- Main body of interview – having established a basic process I then used the three cards with my key words to probe (Robson, 1993) their reasoning asking questions that followed on from what they said. For example, if a student said 'I really like

using the BLU room' I would ask him/her to explain what he /she liked about the room and why - how it helped their learning. I tried to use the language that the interviewee used.

- Cool down – near the end I gestured to all of the artefacts and asked them if there was anything else they thought it would be helpful for me to know. At this point the students would often reflect more widely on their third year. I would often make a few comments at this point for reassurance.
- Closure – at the end I thanked them and reiterated their rights as a participant. At this point many of the students commented that they had quite enjoyed it or found it helpful for reflection. There were many 'hand-on-the door' moments (Robson, 1993), *"oh I forgot to say...."* and so some recordings had a short addition. If the students just commented but didn't indicate that it was something they had 'forgot' then I didn't ask them to repeat it as I thought this might have put them under pressure.

In this way the interviews were not a 'one-way data pipeline' (Holstein & Gubrium, 2004), which very structured interviews are often perceived to be, but an interaction. The approach reflects the 'active interview' (Holstein & Gubrium, 2004) where I was interacting in creating meaning, accepting that I, as their tutor would be shaping that meaning.

I was an 'insider', this meant that I had some knowledge of the 'social world' (Miller & Glassner, 2004) the students described at UH, although I was also an 'outsider' in my

position, age and role (Hellawell, 2006) (see also Appendix 1). This can lead to the interviewee making assumptions that the interviewer knows their meaning. The students knew I was a blended learning teacher, and so a few assumed I would want them to be using technology, and so seemed quite apologetic when talking about their preference for face-to-face activities. Inevitably there was some "reactivity" (Sim & Wright, 2000) to my presence, although I constantly reassured them that I wanted to know what *their* experience and thoughts were. For the interview schedule see Appendix 2.

The location for interview was also explored in the pilot. I gave students the option of choosing any location on campus, again trying to give them some control and reduce the power relationship. The students all chose the BLU office which was very convenient for them as it was within the LRC and as there was a small quiet room at the end. Subsequently for the main study all interviews were carried out there. This interview room was located such that other students are unable to see who is in the room.

All interviews were recorded using a digital voice recorder; interviews took between 17-45 minutes. A few participants were very succinct and didn't expand despite encouragement, as they were volunteers I didn't continue to probe. For the pilot 15 students were interviewed. These interviews were mainly focussed on exploring the interview method. As these students hadn't been organised into groups by preference this data was not added to the main data analysis. For the main study 26 students were interviewed. This data was then transcribed and students were posted a full transcript of their interview and asked to send it back with any amendments or comments they

wanted. This has been described as a member validation (Sim & Wright, 2000) or member checking (Robson, 1993) and gives an opportunity for the participant to validate the transcript and to ensure that the record reflects clearly their view. Only three students made comments, two thanked me and said that they had enjoyed it and another student commented that they were going to use it for their continuing professional development portfolio.

3.3.3 Questionnaires

In addition to the interviews I also used questionnaires. With a cohort of 87, my original intention of using questionnaires was as a method of accessing information from the whole cohort and it was a technique that was very familiar to students as they frequently fill in questionnaires for evaluation of teaching. It was also a quick method, the students are not on campus for many weeks due to clinical placements and access is an issue. It also enabled the interviews to be interpreted within the wider context of the cohort.

All questionnaires contained open and closed questions. I used rating scales (Sim & Wright, 2000) to gain information on the technologies and open questions to explore their choice.

There were three questionnaires aimed at exploring students experience at different points in the process. Questionnaire 1 (Appendix 3) was immediately after the students had expressed their individual choice, questionnaire 2 (Appendix 4) was after the students had filled in the group ground rules contract and so decided the blend their group was going to use, and questionnaire 3 (Appendix 5) was at the end of the process, encouraging students to reflect on the blend they had chosen.

Questionnaire 1 was given in the second year when the students normally complete their group allocation form that gives the data on which they are then allocated to groups. This questionnaire was to organise students into groups for the study and so focused on the technologies students wanted to use. In devising the first questionnaire I used categories that were apparent in the literature and had been raised by students in the pilot interviews. The students were shown the BLU suite and allowed to use the equipment, and informed about the project (Appendix 6). Students then completed the 'usual' group allocation sheet that I had adapted for this study (Appendix 7) stating their friends and were then given Questionnaire 1. The data analysis from the pilot had suggested what blends the students would use, and this informed the design of the questionnaires. I did not pre-code set predefined group descriptions as I thought this would limit students' ability to express their choice, although on reflection I perhaps should have (see also 3.5.3). This questionnaire was aimed at assessing factors influencing the student's individual choice and provided the data for putting the students into groups.

Questionnaire 2 followed on from the students' agreeing in the whole group the blend they would use for undertaking the task and writing and publishing the ground rules contract on their group site (Appendix 8). This questionnaire was designed to explore the students' experience of agreeing a blend in their group and using it for one week.

Questionnaire 3 was aimed at capturing the student's experience just at the end of the teaching period and to put the data from the interviews in the context of the whole cohort.

Paper questionnaires handed out in a class session were used to maximise participation. All students who were willing volunteers in the cohort completed these potentially engaging all students in the study. An online survey tool (e.g. survey monkey or Bristol online) was considered but I felt this would potentially reduce participation, especially by students who didn't like technology. To comply with UH ethical guidelines the questionnaires had to be presented to the UH ethics committee at the beginning of the study, had to be administered by another tutor, and had to comply with a structure laid out in the guidelines. This meant that any students not attending the session where the questionnaires were given out did not receive the questionnaire. I was also reliant on the other tutor giving them out, allowing time to fill them in, collecting them in and answering any questions. This reduces the possibility of coercion.

The questionnaires produced limited rich data. On reflection the structure and layout could have been improved. From the interviews it became clear that the question on the

questionnaire asking 'number of meetings' was probably not that helpful as some groups may have one meeting that went on all day whereas others would have brief 20 minute meetings more frequently. The students filled in the rating scales but put very few comments under the open questions, with the exception of Q1. A more semi-structured question e.g. give three reasons... might have increased the responses. The most useful questionnaire was Q1 as this captured the student's expectations and individual choice and this was helpful to compare with the blend students then used. Q1 contained the most responses to the open questions.

Returns for questionnaires were Q1 - 83, Q2 - 63, and Q3 - 55.

3.3.4 Observation in class

Observation was important to see what technology the students actually used. Yin uses in his book, the use of a technology, as his example for the need for observation. In case study design observing students in the natural setting (Bogdan & Biklen, 1998), can add richness to the data set. I wanted to observe the students' use of the BLU room (LG3) to see what technology they used in this classroom, how they used it and if this impacted on the group in any way. This was supporting data and as such could be described as 'causal data' (Yin, 2002).

I tutored two class groups and another member of staff tutored the other two. I was not a 'complete participant'(Robson, 1993) in that I was not a student and the students knew I was evaluating the room use, I was therefore a 'participant as observer'. I attended several of the other tutor's tutorials in what could be described as a 'marginal participant

observer' role and we compared notes to develop rigour in our recording. Being 'participant observers' (Robson, 1993; Yin, 2002) has the advantage of being able to perceive the context in which the actions were taking place but limited our ability to document our observations in real time.

The observed activities were recorded by the tutor running the session, and were therefore brief, formal counting of behaviours was not used but a standard record sheet was used. An example of a completed observation sheet, made anonymous, is given in Appendix 9. I had considered asking the students to fill in a tick list each time they were in the room as to what technology they had used but thought this might suggest to them that they should be using the technology and change their behaviour. However, any observation may lead to the 'hawthorne' effect and change the activities of the students (Sim & Wright, 2000), but given that this was the normal tutor in the room, not an external 'unknown' observer I hoped any reactivity to observation would be minimal.

3.3.5 Monitoring of online activity, and content on StudyNet

I could observe the students face-to-face in the tutorials but I also wanted to observe what they did online. Activity on their group sites is captured on StudyNet and can be viewed by tutors. In addition there is a quite sophisticated monitoring function available on StudyNet that enables tutors to view log ins, the functions students have used (e.g. file sharer, discussion sites etc). Examples are shown in Appendix 10. This data was therefore naturally available but quantitative in nature. In addition, when the students agreed the ground rules contract they had to post it on StudyNet. This provided documentary evidence on how the group had agreed to work and the blend they thought they would

use. Finally, I could view the actual content of the posts in the discussion sites and analyse the nature of these.

3.4 Ethical issues and confidentiality

All research that involves human beings gives rise to ethical issues that need to be considered (Sim & Wright, 2000). In this section I will discuss gaining ethical approval, ethical issues of participants, data management and confidentiality.

3.4.1 Gaining ethical approval

Gaining ethical approval can be a long and bureaucratic process (Bogdan & Biklen, 1998). This could have been a major issue as, at the onset of this study, the health faculty had a strong positivist stance which is antagonistic to the interpretivist approach of my research. They also had set guidelines which must be followed, for example questionnaires cannot be handed out by the researcher. But it is essential that ethics are given a high emphasis, especially in this study where I am a tutor and have positional power over the students. The ethical guidelines produced by the UH ethics committee, by BERA (2004) and the OU were followed (Table 4). Under a new European directive studies can only to be approved by one ethics committee but must be registered with the ethics committee where the study is taking place. In light of this, approval for this study was gained from the Open University Human Participants and Materials Ethics committee (HPMEC)(2006) (Appendix 11) and the study is registered with the UH ethics committee.

The ethical issues are presented in Table 4, based on the OU principles with the guidelines from BERA (2004) noted where they apply (note the guidelines are numbered from 8-48, 16 and 17 do not apply as no children will be participants, 30-35, 39 and 40 are not applicable as this research was not sponsored).

Table 4 Application of BERA and OU ethical guidelines

OU ethical principle	**BERA Guideline**	**Compliance**
Principle 1 Compliance with protocol	36, 37, 38, 42, 43, 44, 45, 46, 47, 48	The protocol was clearly laid out. This project was supervised by an OU supervisor who critically scrutinised the study. Approval sought from OU and registered with UH ethics
Principle 2 Informed consent	8, 9, 10, 13, 21, 22,	Participants were given information on StudyNet, face-to-face, in writing and had an opportunity to ask questions both face-to-face and online. Students were volunteers. The researcher did not mark any students' work that is not marked anonymously. Students could opt out of the study at anytime, without any consequences

Principle 3 Openness and integrity	12, 19, 20, 29, 41	Participants were made aware of the data collection strategies All participants will have access to publications linked from the BLU website.
Principle 4 Protection from harm	18, 24, 25, 26,	All students who wanted to be part of the study could participate, so there was no rejection of volunteers. Interviews were carried out in privacy in a venue that was identified through the pilot activity. The data was registered with the OU to comply with the UK Data Protection Act 1998 stored on the researchers computer (requiring password) with backups kept securely.
Principle 5 Confidentiality	11, 23, 26, 27, 28,	Data was collected under student name but entered under a number. The researcher did not discuss the emergent data with colleagues who may be doing third year marking, until all third year work had been marked and then confidentiality was respected. In reporting the results participant number was used to maintain confidentiality and reported such that a student could not be identified. It was not envisaged that confidentiality would have needed to be breached, but in the event of a student declaring some information, which required the researcher to breach confidentiality, under duty of care this would have been undertaken, having first tried to support the participant to seek appropriate help. This did not occur.

Principle 6 Professional codes of practice and ethics		As this research is undertaken for a professional doctorate the guidelines of BERA were applied.

3.4.2 Ethical issues of participants in organisation

I was in a position of power in relation to the students within the context of this study. Therefore it was essential to address the issues of informed consent, privacy and confidentiality, anonymity, avoidance of deception, prevent risk of harm or exploitation (Sim & Wright, 2000). Students were volunteers and were given information about the study at every data collection point. Students had a one hour orientation session in the BLU suite (LG3), including explanation of the study, and an information sheet was provided with every questionnaire. Prior to attending for interview students were given a paper information sheet and consent form. When students attended for interview I again told the students about what the interview would entail and then gave them the option to continue or not. All students chose to continue and completed a consent form (Appendix 12). Permission to access the students was sought and given by the programme tutor. In addition my manager excused me from marking third year work during the period of this study. It was essential students felt able to give the story of their experience without there being a perceived risk that this could impact on their education, and so I took these steps to meet this ethical concern.

3.4.3 Ethical issue of data management and confidentiality

Confidentiality was important throughout the process. Interviews were carried out in a private room and away from the main department. Students never knew what category they had been assigned in Table 5 or Figure 12, which made maintaining confidentiality during reporting easier. I didn't discuss my findings until after graduation of the cohort and then never by student name. By collecting data on a number of students it meant that when the data was reported under participant number, even if other students had told each other that they had taken part, it would be hard to identify individuals.

However, despite all of these measures the university, cohort and programme have been identified so complete anonymity was not possible. This is one of the difficulties of undertaking a case study; in order to be transparent and give the context of the findings some identification is inevitable. Therefore the actions to protect anonymity were focused on individuals and student groups rather than anonymity at a cohort or programme level.

Data had to be collected under the student names so that I could link data to each student. However it was then recorded under a number within the database and reported using only this participant number. The administrative staff who entered some of the data for me and transcribed the interviews had signed a confidentiality agreement. The data was registered with the OU (Appendix 13).

3.5 Recruitment of students

This was a major concern as these health care students have very busy lives. This is a professional practice degree so the students have to undertake extensive work placements as well as academic study; in addition many are mature students and have paid work and family commitments. It was important that the study didn't create a substantive additional burden as students would not then volunteer and this would be unethical. Due to students' placements the recruitment and access to students was limited to their on-campus weeks.

Due to ethical concerns arising from my positional power over the students, I wanted the participants to be volunteers and this being a case study; I wanted to collect as much rich data as I could. The student sample was, in a sense, purposive (Silverman, 2005) in that I recruited students studying Advancing Practice. However, all of the cohort could participate, I didn't select students from the cohort. Selection was made after data collection, when I compared groups, to enable the study of diversity of types (Bogdan & Biklen, 1998). Thus I chose a pragmatic approach to seek volunteers (Stake, 2000).

3.5.1 Recruitment for stage 1

Stage one consisted of asking the students to make their choice of blend and fill in the usual group allocation data form. The students had a one hour session in the BLU room where I described what tasks they would do and the technologies available for them and we discussed other technologies that they used (e.g. MSN). The students were quite amazed by the room and enjoyed testing out the interactive white boards and the

internet links. I left the room and questionnaire 1 was administered by another tutor, giving them the information sheet and making clear that this was research and so optional. There was a very high response rate 83 out of 87. I think this reflected the impression the room had made on them and that they had plenty of time to complete the questionnaire.

3.5.2 Recruitment for stage 2

Questionnaire 2 was administered by another tutor at the end of week 1, just before the students went out on placement. There was a poor initial response rate to Q2 which I think reflected their current teaching in research. They had just been learning about positivist quantitative research and anonymity and so were unwilling to fill in a questionnaire which required their names on it. However, in practice-based research it is important to be flexible and creative (Bogdan & Biklen, 1998), so after discussion with colleagues we viewed this as a learning opportunity and I wrote a piece explaining why the names were required (Appendix 14). A colleague then reintroduced the questionnaire when the students returned back on campus and with this information recruitment increased to 63.

Questionnaire 3 was again administered by another tutor at the end of the four week block of teaching. The response rate was 55.

I was particularly concerned about recruiting for interviews. Following on from the four weeks of teaching the students then had a reading week, an examination week and then Christmas, so I didn't attempt to recruit for interview before they were back after

Christmas. They were then back on campus for 5 weeks and I needed to complete all of the interviews in this period. I had explored the best method to recruit for interviews in the pilot see Appendix 15. The students responded best when given slots to sign into with the timing of interviews being very important; a free session between two other sessions was preferred.

So for the main study I used sheets in the classroom (Appendix 16) where participants could sign up, with slots adjacent to teaching sessions. I started with my two tutor groups and then as I had less volunteers in the more technology focused groups, targeted those groups for requests for my colleague's tutor groups. For the main study there were 27 volunteers, all of whom were invited for interview. One was then ill on the day of interview and due to personal circumstances withdrew, leaving 26.

3.5.3 Allocation of students to groups

The students are in the same group for two third year modules for both the module AP which is the focus for this study but also for a research module. We have always tried to create groups that we hope will be effective and work well together. Every year the students are re-allocated to class groups, with existing groups being split up and reformed into new class groups. This is to ensure that even with students' leaving the programme the groups remain the same size and enable the students to develop their skills with working with others - key skills for health professionals.

For the third year the students' class groups are then divided into four small groups (teams) of between 4-6 students. These small groups are the collaborative learning

groups. This process has been achieved by students completing a questionnaire (group allocation sheet) that asks them certain information which is used for creating these small groups. The groups are organised by discussions between the second year tutor and the third year teaching teams. The criteria have been devised and changed over a number of years from experience and the evidence base. This cohort's criterion was:

- Ensuring mixed academic ability groups
- Avoiding pure friendship groups.

In addition, for this study, there was a new criterion added:

- What blend the students wanted to use to work.

Using the group allocation sheet (Appendix 7) and the data from questionnaire 1 (Appendix 3) I manually allocated students into categories where their responses were similar. For example, students who had said that they wanted to use a wide range of technologies were put in the same category. The data I used for this process was from the group allocation sheet (Appendix 7) that is:

- level of face-to-face activity they wanted (Question 1)
- the number of meetings (Question 2)
- the technologies they wanted to use (Question 4)
- the free text comments they made on both the group allocation sheet (Appendix 7) and those on questionnaire 1 (Appendix 3)

I then merged groups that were very small into larger groups with similar responses in an iterative process. Four categories emerged from this process and these are shown in Table 5. These resulted from an iterative process of putting individuals together that had similar responses and then merging groups, then re-sorting, in an iterative way until the four categories emerged. For each student at least two of the criteria applied. Where allocation to a category was difficult, the importance given to the responses was based on question one on the group sheet (Appendix 7) and the number of face-to-face meetings wanted.

Once these categories were identified I put the students into their small study groups. Because I wanted this to be an authentic practice the normal criteria were maintained, the only additional criterion was the choice of technologies and way of working. Finally, there were two students who had deferred from a previous year and the programme team felt should be kept together, so this was a pragmatic and authentic allocation process as opposed to a scientific one. As a result, some groups had students from different categories, e.g. yellow and green, but in general the trend was to put the students who wanted to work using technology together and those that wanted to work more face-to-face together.

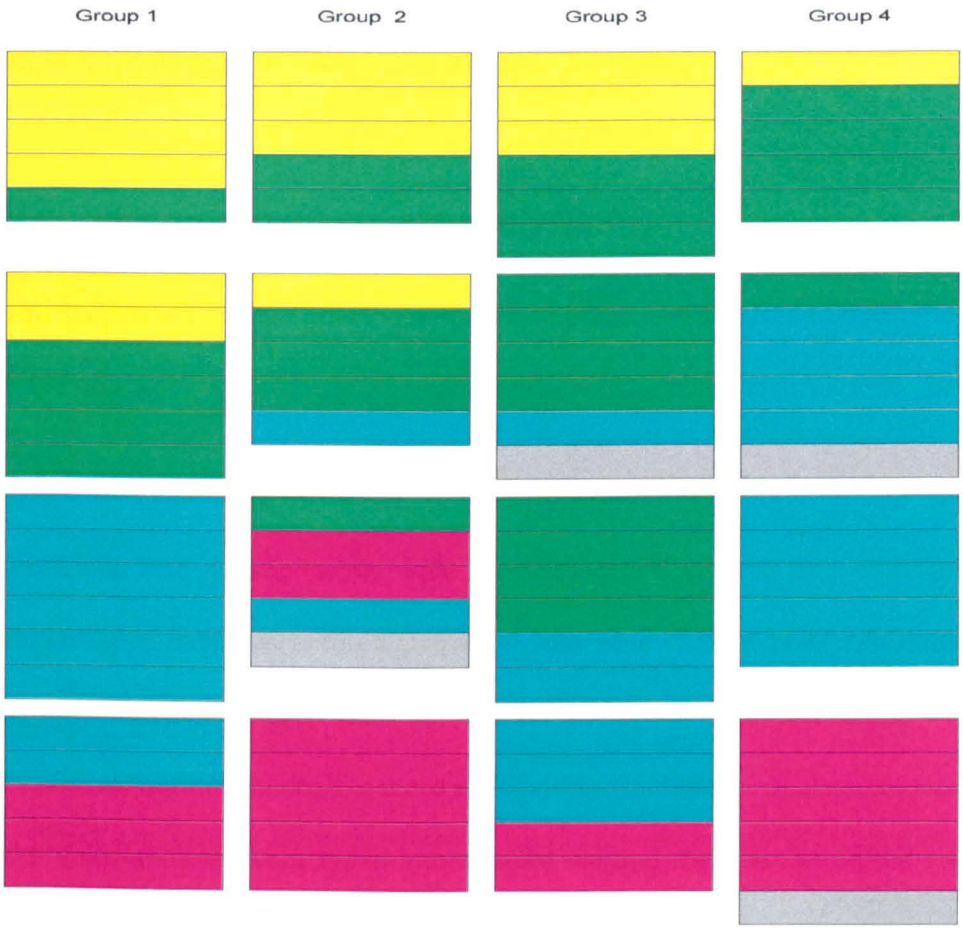
On reflection, this was a very difficult task and it may have been better to produce pre-coded categories for students to allocate themselves to, but having no previous clear data it would perhaps have been difficult to identify what those categories would have been.

Table 5 Categories of student's choice of blend

Allocation	Description
Yellow	Wanted mainly face-to-face Question 1 score 2 or below Wanted more than 4 meetings a week Wanted to use 2 or less technological applications Comments such that wanted face-to-face didn't like technology
Green	Wanted some use of technology Question 1 score 3-4 Wanted 4-5 meetings a week Wanted to use 2 -5 technological applications Comments such as StudyNet can be useful
Aqua	Wanted to use technology Question 1 score 2-3 Wanted 3-4 meetings a week Wanted to use 5 or more technological applications Comments very positive about working online or using technology
Pink	Very technologically and online focused Question 1 score 3-5 Wanted 1-2 meetings a week Wanted to use most technological applications and suggested others Comments about wanting to work online when off site.

Class groups were created that then enabled a different mix of blends to be present in each class group Figure 12 .

Figure 12 Resulting groups from allocation process



Key:

Each column = a tutor class group.

Each coloured box = a student, the colours relate to Table 5

Each group of boxes = a small group (team) that would undertake the collaborative task.

Grey = no questionnaire.

Students were not told which category they had been allocated to make anonymity of reporting easier and also so that they didn't feel obliged to live up to their group allocation (e.g. 'high technology'). I also put the groups in a random order in the list of names that was published to the students, so that it would be difficult for anyone else to identify the description of each group or their own categorisation.

3.6 Data management and analysis

This section will present how the data was managed and analysed to reach the findings of this study.

3.6.1 Management of data

Interviews and questionnaires were transcribed and entered into electronic formats. Quantitative data was entered into Excel with each student being represented on the vertical access and each question on the horizontal axis. Qualitative data for the interviews were transcribed in Word and imported into Nvivo. Qualitative responses from the questionnaires were typed into a Word file and then also imported into Nvivo (a software data handling package). All electronic data was kept on my password-protected laptop under a student number.

All paper-based data including questionnaires, observational record sheets and group sheets, were organised under each student and group using participant number. The paper-based data alone filled four A4 lever arch files; each file was one class group that

was then subdivided into the four small collaborative groups within which there was the data for the individual students. This made it easy to analyse at a student or group level.

In this way I had easy access to a data set for a student, group and the cohort, and I could link paper and electronic data easily by participant number. In addition to immerse myself in the data, essential in case study design (Stake, 2006), I loaded the digital recordings of the interviews onto my IPod, to listen to repeatedly. After the analysis period I deleted this data.

3.6.2 Analysis

As Bassey (1999) states:

> *"Case study has no specific methods or data collection or of analysis which are unique to it as a method of enquiry. It is eclectic ...researchers use whatever seem to be appropriate and practical."* P69.

My case study produced very large volumes of chronological data. Techniques that can be applied to qualitative data analysis include counting of events, grouping, coding, categorising, pattern matching, use of rival explanations and many more that are detailed in most standard texts (French, Reynolds, & Swain, 2001; Miles & Huberman, 1994; Robson, 1993; Silverman, 2005; Sim & Wright, 2000). Tools can be used to support data analyses; these can remove some of the barriers to analysing large volumes of data. Using software packages can reduce time for basic analysis and enable more complex analysis to be undertaken (French, Reynolds, & Swain, 2001). NVivo, a computer software package

was used for the qualitative data and to aid organisation and analysis of the data. It is important to note in NVivo, the categories are still created by the researcher.

I viewed as the main data set the interview data, as this was the students' own voice and the richest data. I used the deductive method (Miles & Huberman, 1994) of developing free nodes in NVivo by analysing interview data highlighting the text and allocating it to a node and creating new codes as required. By doing the interviews from one group of students at a time and analysing the students online group site, and data in excel, I was also able to engage in the process of data reduction (Miles & Huberman, 1994). I produced a group sheet giving an overview of each group (Appendix 17). The comments from the questionnaires were analysed in NVivo.

The quantitative data was analysed at a cohort level in Excel to create charts for visual analysis – data display (Miles & Huberman, 1994). This was undertaken by selecting each question (vertical axis) and using the 'chart facility' to create a chart for visual analysis.

Yin (2002) suggests that data analysis consists of:

> *"...examining, categorising, tabulating, testing, or otherwise recombining both quantitative and qualitative evidence".*

Yin (2002) cautions that verbatim transcription and analysis by categories and frequency are inappropriate for such overall analysis, although they may enable the investigator to start *'playing'* (Yin, 2002) with the data. It is better to start with an overall strategy or individual data analysis may not reveal any insights that answer the main study's

questions (Yin, 2002). Despite reading his book and even writing about this in my year 1 report, I initially fell into this trap by coding the interview data meticulously in an almost grounded theory approach (French, Reynolds, & Swain, 2001) and getting entrenched in the detail. In previous discipline based research I have undertaken I have used number of responses under categories and my historical positivist stance was impeding my analysis. Fortunately the value of a critical friend, someone who will read and comment on the presentation of the findings (Bassey, 1999), came to the fore in the form of my supervisor who encouraged me to make my assertions at a higher level and more focussed on my questions.

I therefore went back to the findings and sought more overarching patterns (Miles & Huberman, 1994). I arranged some of the reduced data more in line with my questions, merging the initial analysis in an iterative process. I kept returning to the data and looking at different clustering until 'tentative assertions' (Bassey, 1999) emerged.

Immersion in the interview data led to 'tentative assertions' at a cohort level, which I could check for representativeness (Miles & Huberman, 1994) using observation data, analysis of online data and questionnaire data. The quantitative data was analysed in Excel for each question producing charts. This data was then used to determine whether it supported the qualitative data. I also used the observation data to further explore if all of the data sources were supporting similar assertions. Throughout this process I was considering rival explanations (Yin, 2002), and moving back and forth between the qualitative and quantitative data until a clearer theme emerged (Appendix 18). Finally, I

looked at a group level and compared groups. When comparing the groups I was able to use the reduced data in the groups sheets for cross-case synthesis, leading to 'tentative assertions', about group activity.

The advantage of having many sources of data enabled a more complete picture to emerge and for me to consider rival explanations (Yin, 2002). This is essential to explore the plausibility of one's findings (Miles & Huberman, 1994). For example, from the interview data it became obvious that some groups had met face-to-face more than others. It could have been suggested that those groups meeting less were working more online. But analysing the monitoring data on StudyNet showed that the group technology use was similar. Then it could have been suggested that these students were using a different technology (e.g. Facebook) but the Questionnaire 3 data and the interview data didn't support this. Therefore these students were actually doing more individually and cooperating. By going back to the comments made by the students in interview I could affirm this. This process of using multiple data sources and perspectives is described as 'triangulation', and is used by researchers to increase the worthiness of their research (Stake, 2000), although Richardson (1997) suggests that the imagery of a triangle is too restrictive and the image for the postmodernist researcher should be a crystal as it:

> *"..combines symmetry and substance with an infinite variety of shapes, substances, transmutations, multidimensions, and angles of approach" p.92* (Richardson, 1997).

Through this analysis I was able to use the advantages of a mixed methodology to gain an in-depth understanding (Denzin & Lincoln, 1998) of the data.

Chapter 4. Findings

Being a case study design and following the advice of Yin (2002) I collected considerable data from interviews (26), questionnaires (Q1 n=83, Q2 n=63, Q3 n=55), observation and monitoring of online trails (cohort n=86). Following on from analysis I have, through necessity and given the constraints of this thesis, focused and reported on this data under my two questions.

For the first question, 'What was the student's experience of choosing and using a blend?' I have presented the data at a cohort level, although using individual quotes.

For the second question, 'Was there any relationship between the students' choice, the blend used and the collaborative learning that took place?' I have divided the findings into three sections:

- the similarities between the groups in the process the students followed and its relationship with collaborative learning
- the differences between the groups, illustrated by comparing and contrasting two groups with the greatest difference
- the students' own perception of their collaborative learning.

For the second question I have compared groups for the similarities and differences and then presented my findings at a cohort level for collaborative learning. After each section I have discussed my findings in relation to the literature.

4.1 What was the student's experience of choosing and using a blend?

The students were in their third year of an honours degree programme. They had used the institutional MLE (StudyNet), for the previous two years. Before making their choice they had a workshop session demonstrating open source applications and the technologies available in LG3 (the high technology classroom). They had made individual choices at the end of year 2 and were then put into groups based on that choice. Each collaborative group then agreed how it would work as a group, filling in a ground rules contract that documented the blend they would use. This was posted on their StudyNet group site (a private area on StudyNet for each group). The students then prepared and gave weekly seminar presentations.

Data was analysed at a cohort level with individual student quotes to illustrate the findings.

In making the choice of blend the following themes emerged:

1. Past experience - use what you know works
2. Efficiency - use technology to maximise efficiency
3. Quality of interaction - need quality communication for co-construction
4. Inclusivity - must include all of the group's participants
5. Purpose - technology is compartmentalised

For each theme I will outline the findings and then present the evidence. The themes were identified from amalgamating the codes from the questionnaires and interviews,

and then using the other data sources to explore in an iterative process until clear themes emerged. The themes all interact and so, although separated for the purpose of creating meaning, they are interconnected.

4.1.1 Past experience - use what you know works

4.1.1.1 Introduction

Although not closed to the idea of using technologies that they hadn't used before the students tended to use familiar technologies. They each had personal preferences, and had made the decision of how they wanted to work in year 2. As they were then put into groups for the third year based on this preference, they then continued with this choice expressing it as a group in their ground rules contract. After the first week and seminar presentation (questionnaire 2) they wanted to continue with the same blend, apart from some minor amendments. So they had the choice that they wanted. They made a choice based on their past experience and then kept to it. So whilst open to the idea of new technologies as expressed in their group sheet and questionnaire 1, when it came to actual practice they used the blend they had previously experienced.

4.1.1.2 Evidence

Personal preference based on past experience

In questionnaire 1 the code their 'own personal preference' had many comments:

> *"How I have worked before. Working face to face but I don't mind working sometimes with technology" – Participant 69, Q1*
>
> *"Personal learning style and previous experiences of group working." - Participant 44, Q1*

My personal preference of how I like to learn – face-to-face during the day, technology at night where necessary". - Participant 3, Q1.

"My personal experiences of what has worked well and also my personal commitments outside of University". - Participant 19, Q1.

In the quantitative rating scale data the 'personal way I learn' (Figure 13) and 'previous experience' (Figure 14) were rated as the most important factors that influenced their choice.

Figure 13 Pie chart to show responses to 'Personal way I learn'

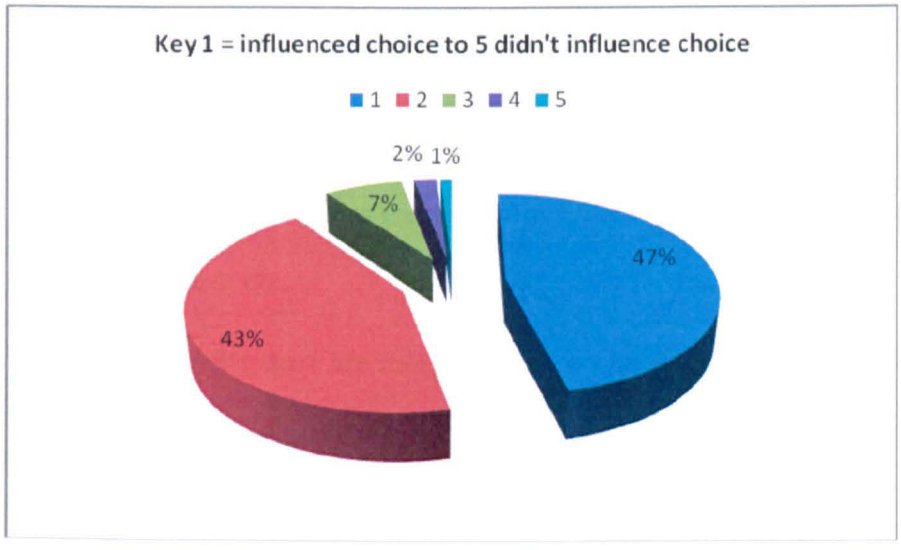
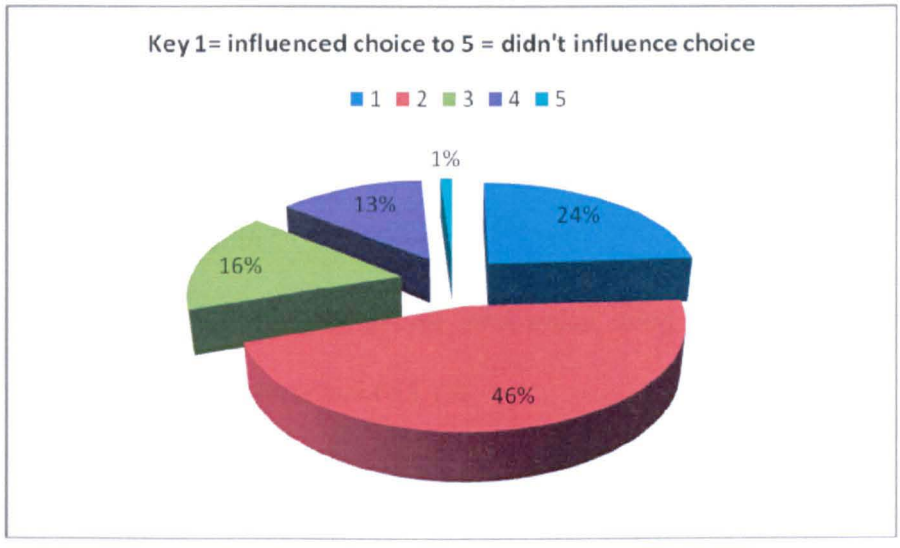


Figure 14 Pie chart to show responses to 'Previous experience'



This was again reflected in questionnaire 2 and at interview:

> *"My own personal choice – I feel I get more out of face to face meetings"*
>
> *Participant 5, Q2.*
>
> *"It's not that I don't like using technology I just kind of stick to what I know."*
>
> *Participant 38, Interview*

Use a familiar Blend

The students wanted to use a blend of face-to-face and online technology; this reflected their experience at UH in years 1 and 2.

> *"Most communication should occur regularly and in face to face meetings. Technology is a useful adjunct, but should not replace team meetings (i.e. both should compliment each other)." - Participant 44, Q1.*

"I feel that a mixture of technology and face to face meetings will be useful." – Participant 20, Q1.

"I expect that a group would work together and be in contact a lot. Whether that is using technologies or meetings. I think it is good to have an equal mixture of both." - Participant 21, Q1

"Please put me with people who enjoy using a blend of meetings and technology." –Participant 15, Q1

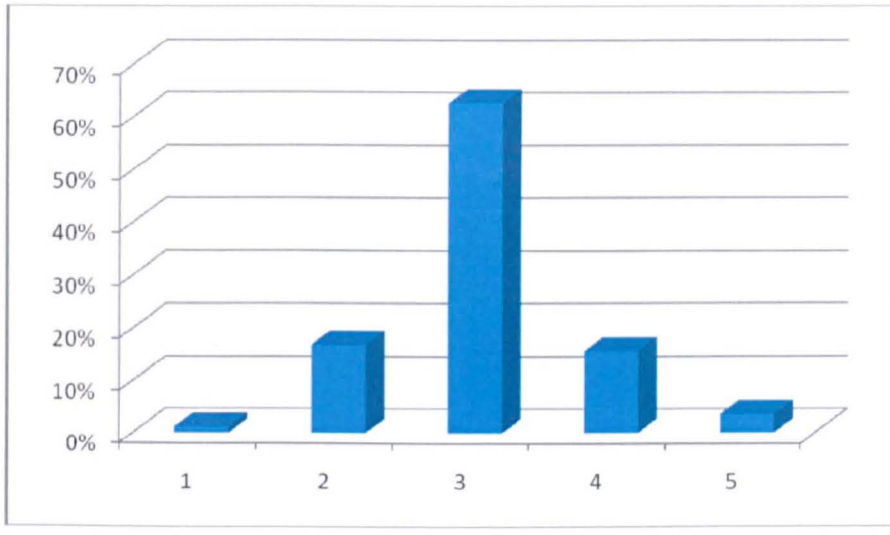
The students expressed that the blend that they had chosen was easy and was familiar to them.

"Ease. Everyone felt happy mainly using StudyNet and 3 meetings per week" - Participant 29, Q2.

"I'm much more comfortable working like that" –Participant 11, Interview

That they wanted a mixed blend was also seen in the response to the question that asked them to rate what blend they wanted with 1 being mainly face-to-face and 5 online communication. The overall rating was 3 which was the middle point.

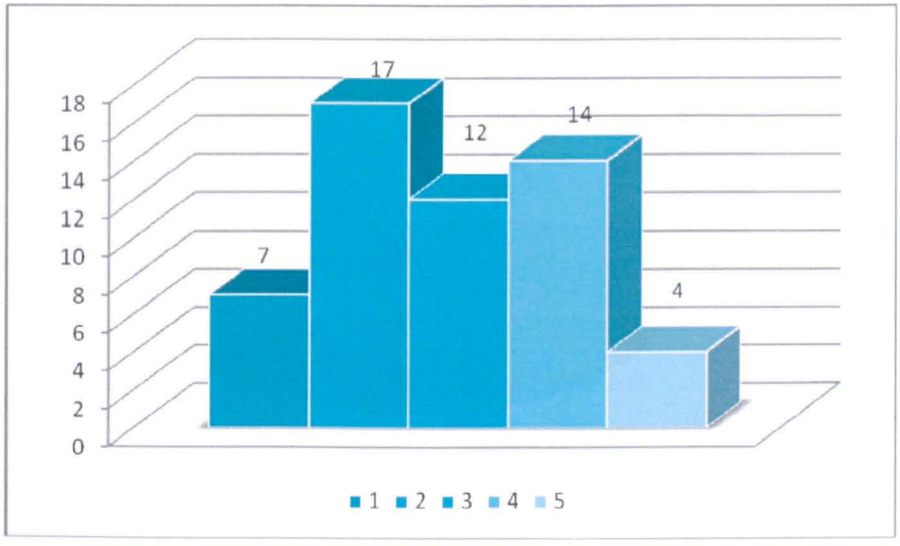
Figure 15 Responses to rating scale on choice of blend (Q1)



Key: 1 face-to-face to 5 online

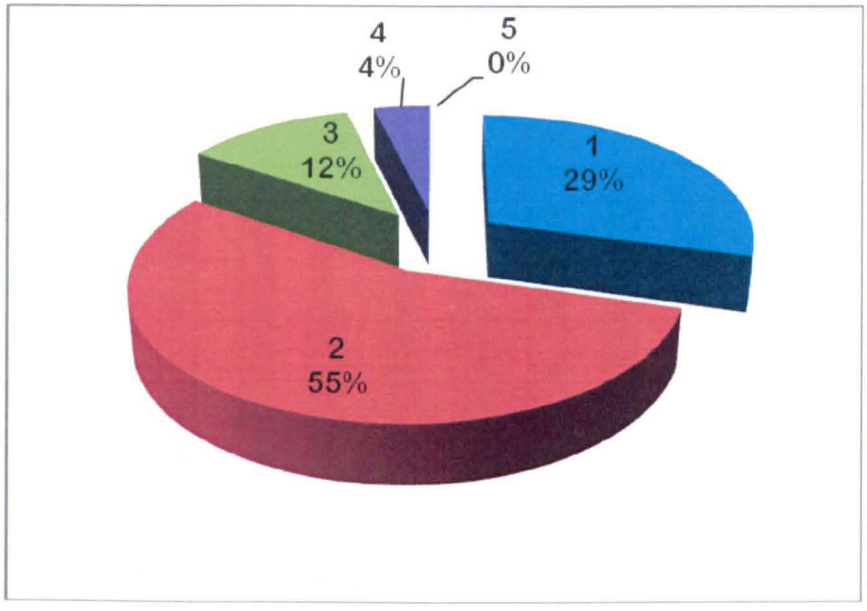
By the time they completed questionnaire 2 all students had used their StudyNet group site and had face-to-face meetings, reflecting their use of a blend. They had undertaken one week's activity, producing a presentation on the Thursday. During this week the students had met face-to-face a number of times during the 4 days leading up to the Thursday presentation (Figure 16).

Figure 16 Bar chart showing the number of times the students had met in their group in the first week of study



Having been put into groups based on their individual choice, when it came to questionnaire 2 the students expressed that the way they had worked in the first week reflected their choice (Figure 17). When rating the questions asking if they had got their choice not one student rated this as 5 – "substantially different from what I wanted", with the majority 84% rating 1 or 2.

Figure 17 A pie chart to show responses to did you get the blend you wanted?



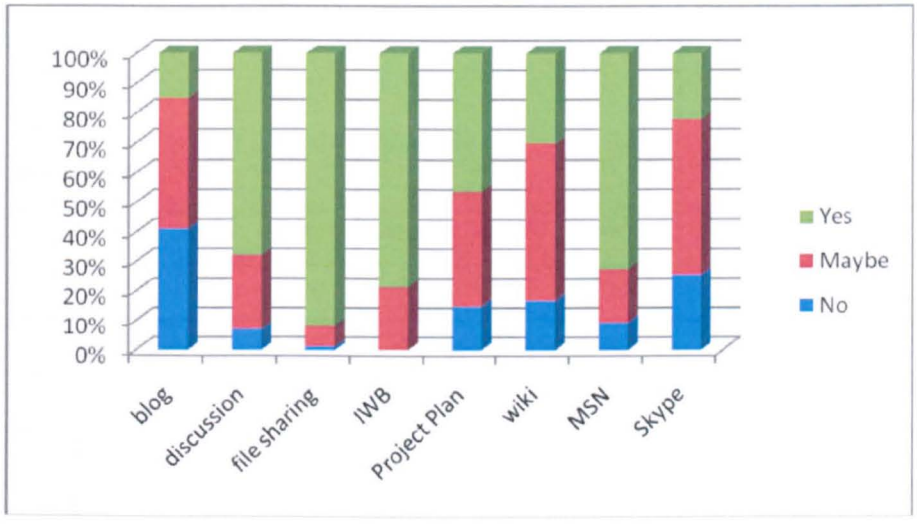
(Rating scale 1-5 where 'Exactly what I would have wanted' = 1, to 'Substantially different to what I wanted' = 5)

Of the 51 students who responded (4 made no response) to the question 'did they want to change the blend?' 45 (88%) of the students said NO they didn't want to change the blend and only 6 said YES they did. The students who wanted to change mainly wanted more face-to-face meetings.

That was not to say that students were not open to the idea of using new technologies as expressed in Questionnaire 1. In Questionnaire 1 the students expressed that they might like to use a wide range of technologies but when it actually came to doing the work they didn't use them. Figure 18 shows the students responses to the questions as to what technologies they wanted to use (YES), maybe wanted to use (MAYBE) and didn't want to

use (NO) these relate to individual responses, when they put in their request at the end of year 2.

Figure 18 Technologies the students said that they wanted to use in questionnaire 1



Key: Technologies they wanted to use (yes), maybe wanted to use (maybe) and didn't want to use (no) these relate to individual responses.

Figure 19 shows what the students actually used based on analysis of their group sites.

Figure 19 Technologies that the students actually used on StudyNet (from monitoring online groups sites)

Function:	File sharer	Blog	News	Wiki	Planner	Discussions	Tagging
	Use	Posts	Posts	Use	Use	Threads (posts)	Use
Group (names removed)							
1	yes	no	no	no	no	12 (19)	yes
2	yes	no	1	no	no	3 (4)	no
3	yes	no	3	no	no	5 (9)	no
4	yes	no	1	no	no	14 (15)	no
5	yes	no	3	no	no	4 (5)	yes
6	yes	no	no	no	no	no	no
7	yes	5	no	no	no	no	no
8	yes	no	no	no	no	3 (5)	no
9	yes	no	no	no	no	10 (11)	no
10	yes	no	4	no	no	6 (7)	yes
11	yes	no	no	no	no	14 (30)	no
12	yes	no	5	no	no	6 (9)	no
13	yes	6	16	no	no	no	no
14	yes	1	1	no	no	12 (13)	no
15	yes	no	no	no	no	7	no
16	yes	no	5	no	no	15 (24)	no
Total usage N=16	16	3	9	0	0	14	3

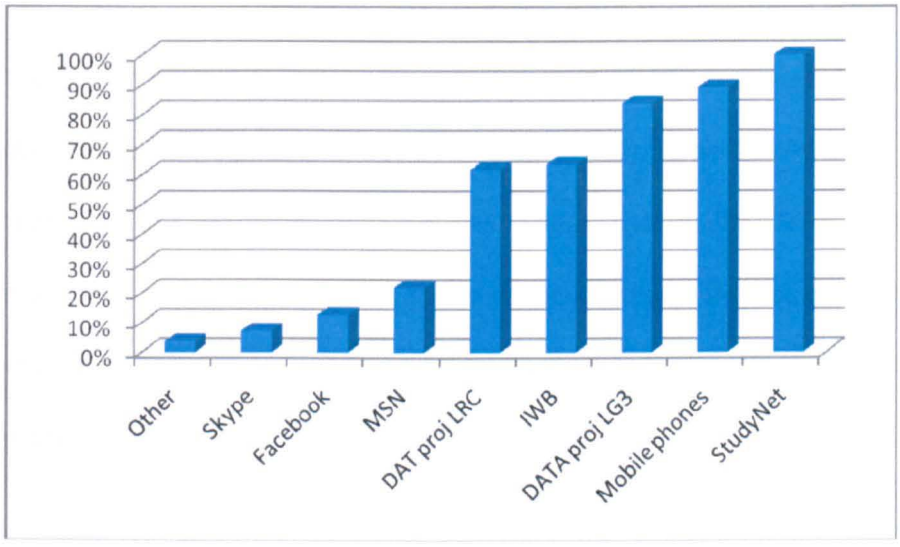
Comparing the data from questionnaire 1 (Figure 18) to what the students actually used (Figure 19), it can be seen that the students didn't use the range of technologies online that they thought they might like to use. For example, on StudyNet the Wiki was not used by any group although 25 (30%) of students had said that they wanted to use it and 44 (52%) had said maybe in Questionnaire 1.

It could be suggested that the reason the students didn't use more facilities on StudyNet was because they were using open sources such as social networking sites (e.g. Facebook), instant messaging (IM) applications (e.g. MSN[1]), or voice over internet protocol (VOIP) with IM applications such as Skype. But the trends in the questionnaires and interview comments suggested this was not the case. In questionnaire 3 (see Figure 20) and through the comments at interviews it was clear that students had also not used open source applications to the extent that they thought they might (see also section 4.1.5). Comparing Q1 (n=84) and Q3 (n=55) only small numbers of students used Facebook, MSN or Skype. For example in Q1 for MSN - 61 (73%) of students said YES, 15 (18%) said MAYBE but there were only 12 (22%) users in Q3. For Skype the trend was similar, in Q1 18 (21%) students said yes they wanted to use it and 43 (52%) said maybe in Q1 but in Q3 only 4 (7%) had actually used it. Facebook was not a category for Q1 as it hadn't emerged in the pilot data as it was a 'new' technological application but was mentioned in Q1 by 2 students under 'other' in Q3 7 students reported using it for study.

[1] MSN at the time of this study was only a text based messaging application; it now has voice and video options.

It was not that these students were not familiar with these technologies or their use as all of the interviewees said they used Facebook socially.

Figure 20 Technologies and applications used by the students – Questionnaire 3



Students had therefore not used all of the facilities on StudyNet that they thought they would or used open sources such as Facebook or Skype to the extent that they had indicated in questionnaire 1.

In summary the students thought they would use more technological applications than they did but actually used a blend with which they were familiar – StudyNet and face-to-face meetings.

4.1.1.3 Discussion

If we accept that past experience will influence engagement (Sfard, 1998) then it is not surprising that the students based their choice on their experiences from the previous two years at UH. At the time these students were studying there was no assessment in the programme, either formative or summative, that required them to use online discussion. In Hughes and Daykin's study (2002) some students did not see using technology for interaction as part of their professional identity. Given that the students in my study had not been required to use online discussion threads before the third year in their academic study, they may have not seen this as an activity which was part of professional practice.

This study was undertaken in one of the foremost blended learning universities. UH is rapidly adopting blended learning, with lecturers transforming the way they teach (Alltree, 2008). However, this research cohort had been taught using face-to-face classroom based activities with the lecturers using StudyNet largely as a repository to post lecture notes, videos, useful links, module information and quizzes that were individually focused. This use can be described as Web 1.0 as opposed to Web 2.0. The latter term is used to describe the new technologies enabling co-authorship and participation rather than information giving (Armstrong & Franklin, 2008). This cohort's past experience of interaction was largely as a face-to-face activity. The students in my study were adopting the "ways-of-behaving" (Handley, Sturdy, Fincham, & Clark, 2006) that their lecturers had adopted in the previous 2 years. Whilst the discussion sites have been used in the programme, the majority of posts have been questions posed by

students, often answered by tutors and focused around procedural and administrative aspects (Alltree & Thornton, 2004; Thornton & Alltree, 2002). Also, where student materials have been produced they have been in the format of PowerPoint files (Doolan, Hilliard, & Thornton, 2006), rather than a collaborative online technology such as a Wiki. The students have used face-to-face meetings for interaction and online as a repository or for basic information giving, in the same way that their tutors have.

This situation has changed for subsequent cohorts. Use of Web 2.0 technologies is already being developed with the use of Wiki's and podcasts being introduced early in year 1 (Anders & Thornton, 2008) and then used for an online collaboration while the students are on placement at the end of year 1 (Rickard, 2009). That both of these activities are formative and early in the programme should encourage the students to use the online Wiki.

In summary, although open to the idea of using technology the students actually used mainly the file sharer on StudyNet and face-to-face which reflected their past experience of studying at UH.

4.1.2 Use technology to maximise efficiency

4.1.2.1 Introduction

Time was a major issue for the students. They used the file sharer on StudyNet extensively. This meant that they could see each others work so they knew what they needed to discuss when they met face-to-face. This maximised the efficiency of their

face-to-face meetings. Some groups did minimal collating of information on the file sharer. When they were working together they sometimes used many computers to make it more efficient, so that several students were searching and then going back to the 'master' computer where they were compiling the presentation. When meeting, students said it was automatic to turn the computer on; by using a computer they could link the online and classroom environments and upload immediately onto group site. The groups used the data projectors and linked to their group sites when they were in LG3 as this enabled them to download and upload their output and make changes in real time. When arranging meetings other than formal tutorial sessions the students tried to book group rooms in the LRC so that they could recreate some of the function they had used in LG3. Students felt under a time pressure and so used mobile phones for quick messages due to the speed of response, and several mentioned that they stated they had achieved the best they could in the time available.

4.1.2.2 Evidence

Time

Time was a factor in responses in all three questionnaires. In questionnaire 1 students' were already identifying the time pressure.

> *"The quickest, most effective method that I am most confident with" – Participant 60, Q1.*
>
> *"Time factors." - Participant 81, Q2*

In questionnaire 2 again 'time' was a factor that had influenced their choice.

"What I prefer and find most efficient use of time." –Participant 60, Q2

"Time in Uni and how late lectures go on. Time outside of Uni with other module commitments. Time basically" – Participant 1, Q2

"Wanted to meet and use free time between classes." – Participant 3, Q2

Finally, at interview, time still was recognised as a constraining issue.

"I think time was a big factor in the blend I think, in the circumstances and the time pressure that we had". - Participant 25, Interview

Students used computers when meeting face-to-face so that they could put the information straight on to their group site and make the changes immediately.

"... tend to be with a computer somewhere, whether it was someone's laptop or in the LRC it didn't matter, but yeah, everything was pretty much onto computer straightaway to save the time of someone scribing and then having to put it all on to computer, it seemed a bit daft, erm, which worked well." – Participant 33, Interview.

"We would invariably meet with a computer because pretty much that's where we did all the work." – Participant 42, Interview.

Some groups used many computers at once.

"We preferred meeting round computers... if we grabbed computers downstairs we usually tried to get about three computers beside each other so we could have three people on computers researching, looking at things and then someone in the middle would just kind of USB pens be flipping all back to the main computer." – Participant 15, Interview.

Use StudyNet as repository to maximise efficiency of face-to-face

In the interviews and in questionnaire 3 the students reported using the facilities on StudyNet for mainly 'low level' collaborative purposes such as using the file sharer as a repository and discussion sites for messages, although they often preferred using mobile phone texts for messages.

"So it was usually dumping information on StudyNet and if people wanted to access it they could." – Participant 22, Interview.

They saw StudyNet largely as a repository, not as a means of communication.

"Whereas StudyNet I find is a brilliant resource, I guess more. I see it as something I can go onto to check the progress to reflect on something or read something. So I see it more as a resource rather than a method of communication." - Participant 80, Interview.

The file sharer was used extensively. For example, one group, who had many meetings face-to-face[2] each week, had over 268 files. This suggests the group was creating a large repository of information for the group to share. Based on the analysis of monitoring of StudyNet group sites, all groups posted up their presentations, additional resources. In addition some groups' organised folders and three groups used tagging. I was not however able to quantify fully the use of the file sharer as there is an editing check out file system that allows files to be opened and changed without uploading a new file, as well as a function to post new files. This made it impossible to monitor all of the activity on the file sharer.

> *"I can't speak of other groups because I don't know how other groups really performed but I think we utilised StudyNet ....I think our group uses a proper learning resource and it really helped us when it came to doing the exams at the end because it was just all there for us. It was really good in that sense. It was really used as a resource for us." – Participant 14, Interview*

This evidence shows how they gathered the information together, and in some cases undertaken some collating, so that when they met they could discuss it.

> *"like on the Monday we'd say can we all make sure stuff is up [on StudyNet] by Wednesday morning for example so that when we all come together we can fix it." - Participant 24, Interview*

[2] This group was a high face-to-face group with four 'yellow' students and one 'green' student

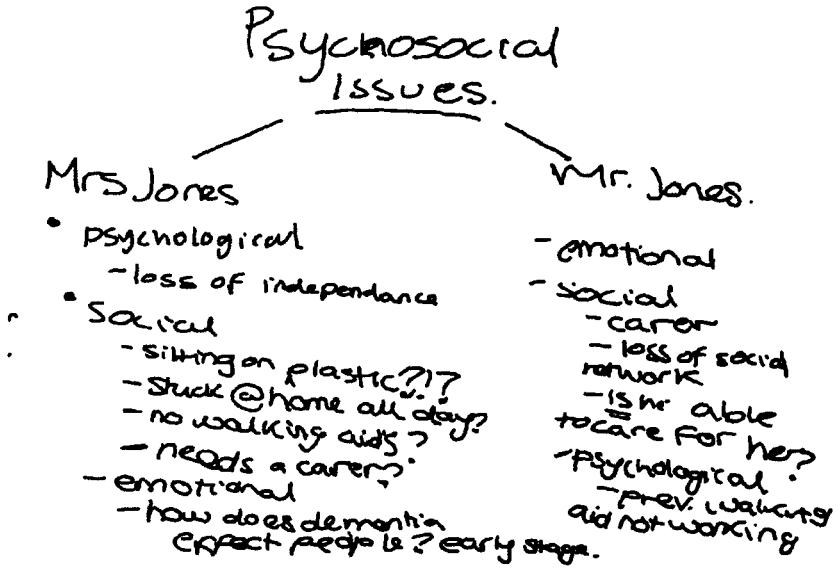
Use technology in Face-to-face sessions to link to online group sites

Students did use the classroom technologies in LG3 for 'higher level' functions. They could use the interactive white boards to capture and save their discussions and post them onto the group site.

> *"I think we found that really useful to have all of the boards and technology things down there [LG3], we did find that very useful. ...that facility down there was very good. We used that obviously... we normally had one person standing up, sort of going through some ideas using the pen on the board and then we were sort of shouting ideas out to them which we did find very helpful, just sort of spider diagrams and things like that." –Participant 29, Interview.*

An example of a student group's output is shown in Figure 21.

Figure 21 Output from students using the Interactive white board to brainstorm



Using computers connected directly to the internet enabled students to capture their discussions in real time and to search the internet. This facility was highly valued by the students, who were very enthusiastic about LG3 at interview.

> *"The whiteboard in the erm...we had four, five screens I think around the room erm, which I think was useful. I wish we could always have a room like that" – Participant 40, Interview.*

Interviewer checking over something the participant has just said about how they liked LG3	..so in terms then of your choice, if you had opportunity to work again am I right in saying you liked working face to face using StudyNet as a repository but you'd like to have group rooms where you could use the computer as well?
Participant 11	*"That for me that would be the ideal. Erm, yeah having the group rooms available would make a big difference I think" –Participant 11, Interview*

Observation data of the students' activities in LG3 confirmed that the students were using the computers and data projectors to create files and upload them to their group sites.

Observation week 9

All groups in class 1 had used in LG3:

Internet, PowerPoint or Word and uploaded a file (this was confirmed by looking at dates and times on StudyNet of uploaded files)

Frequently I had to be very 'encouraging' to get students to leave the room at the end of the session.

When students met outside of the tutorial, they often tried to get a group room in the LRC (these are in high demand) where they have a data projector and computer. 33 (60%) of students in Q3 reported using group rooms. When students met, they had someone on a computer, only one group said that they sometimes met without a computer.

"The group rooms are a good source to access the computer, get everyone around it really and discuss things as well." - Participant 1, Interview.

A mature student reflected in Q2, how the use of computers in the classroom and the group sites on StudyNet contrasted with the 'old fashioned' approach of photocopying.

"Time. Ease to upload information instead of photocopying." –Participant 20, Q2

In summary the students felt a time pressure and so where technology could support the efficiency of undertaking the task they would use it.

4.1.2.3 Discussion

The time pressure was perhaps not surprising, reflecting the difficulties of undertaking a professional course that has to squeeze in an additional 1000 clinical practice hours during the three years. The time pressure recognised by the students to complete these weekly tasks didn't lend itself to asynchronous communication via text based discussion sites. The importance of the *"immediacy of response"* (Conole & Dyke, 2004) led to the students using mobile texts for process communication e.g. "where is the meeting?", rather than functions on StudyNet. In a study by Peacock and Hooper, (2007) time was also identified as a theme. Students identified that to use the asynchronous discussion site required them to log on, read posts, write a post and the whole interaction was time consuming. The undergraduate students felt that this, combined with other factors, made online discussions *"inappropriate"*.

The students in this study didn't use the text based discussion sites for collaborative meaning-making. Asynchronous communication has often been associated with individual reflection (Conole & Dyke, 2004). The key reflection phase of this task followed the seminar, where the students received peer and tutor feedback and this was handed out in class. Therefore the time pressure pushed the students towards using synchronous face-to-face communication.

Students used the file sharer on StudyNet as a repository. This "off loads" (Suthers, 2006) some of the activities of learning onto the technology as the students could see where there was conflict, overlap or differing views that they then discussed face-to-face. However, this could be interpreted as the students being engaged more in gathering information than in actually engaging in active learning. In Peacock and Hooper's study of physiotherapy students (Peacock & Hooper, 2008), the physiotherapy undergraduate students' use of an MLE was focused on gathering and storing information rather than engaging with it. The key difference for the participants (students) in my study is that they were engaging with the information because they had to answer a specific question in a short presentation. They had to apply the information to a practice case. Peacock and Hooper (2008) also seem to be suggesting that the students didn't then read and use the information that they had collected. Gulati (2008) suggests that "silent reading" (online) can be an important part of learning and creates a safe "learning zone", so that making students participate in authoring online discussions is a "*denial of constructivism*". That the participants in my study were using the repository so that they could read each others' work both supported their need for efficient use of time and also their learning. It

enabled the students to identify the areas of conflict. Conflict is an important aspect of learning (Piaget & Inhelder, 1969) and the conflicting views created conversations leading to a deeper understanding. It may be that by reading online gave students who had less self-efficacy the ability to come to face-to-face meetings with greater agency and ability to interact (See also section 4.2.2 and 4.2.3 where I discuss this further).

The students valued the use of LG3, stating it would make *"a big difference"* if they had such learning space always available to them. What the participants valued was using technology to link the classroom and online experiences in an efficient manner. This fits with the transformative approach of blended learning not simply adding online components (Garrison & Vaughan, 2008), but linking the physical and online *"in a seamless manner"* such that the boundaries between physical and virtual become blurred (Armstrong & Franklin, 2008). There is still debate as to the relationship between physical learning spaces and students' learning, with much research at an early stage (Hartnell - Young, Pearshouse, Riachi, Graber, & Brown, 2008), but for the participants in my study the classroom technology was highly valued.

However, despite this emphasis on efficiency the students would generally still travel to face-to-face meetings, rather than use an online technology for communication.

4.1.3 Quality of interaction

4.1.3.1 Introduction

From Q1 all the way through the study the students expressed their view that to collaborate over knowledge construction required face-to-face communication. They would generally not change other students' work online, preferring to wait until they could meet in person. In the interviews, all of the students reported that they had face-to-face meetings in addition to the tutor supervised tutorial, some groups even meeting several times a day, and on almost every week day. On the whole the students were on campus anyway but students would even travel in to meet. When they did meet there were high levels of interaction observed in the tutorials and described by the students in the interviews. They chose face-to-face as it gave them the quality of interaction that they felt was not given in asynchronous discussion sites or instant messaging.

4.1.3.2 Evidence

Co-construction requires face-to-face

The students stated that to collaborate (co-construction) face-to-face was essential; this was identified in the first questionnaire and throughout data collection to include every student who was interviewed.

> *"I think I definitely learn more from face to face than virtual means I'm more comfortable in that setting as well and when we did meet to discuss issues and somebody said something and someone else disagreed it was useful to have a mini debate because then you can really get to the bottom of the issue and*

resolve any potential conflict so I definitely...for me I found I learned better in a face to face setting." – Participant 63, Interview.

The view that online was only for housekeeping and administrative functions was also reflected in the analysis of the online data, the posts on the discussion sites were not collaborating over meaning.

Examples of posts on group site discussions

hey gals,

will have to put my slides on later in eve, after 10 coz haven't quite finished them but have to go out now.

will put final version on my USB late this evening or early 2m morning

–Participant 32, discussion site post

Hey guys.

Just to remind you that we are going to meet at 9am in the LRC thursday morning.

See you all then

-Participant 40, discussion site post

They were positive about StudyNet as a resource but they didn't see online communication as replacing face-to-face, the online environment was an adjunct.

"I have never used technologies to a huge degree in team working (aside from using StudyNet group pages) ..... I am worried that technology can become a substitute for face-to-face contact though." Participant 63, Q2.

"Face to face meetings meant that everyone could discuss their findings and start the presentation slides" – Participant 70, Q2

The need to meet to face–to-face was mentioned by students in every interview. At interview some students expressed surprise if I even explored an online alternative to face-to-face communication, as if it was an idea that they wouldn't have contemplated.

Interviewer	Responding to previous comment made by participant *Did you actually try and do any collating over StudyNet?*
P	*Erm, no we didn't no. [*very adamant*]*
I	*Why do you think that was?*
P	*Erm, I think it's for you know democracy you know whereby if we're all there we can all have a say and if we don't agree or if somebody takes the initiative that person is perceived to have perhaps more influence on the decisions and..... we didn't even contemplate doing it on StudyNet to be honest. We just automatically assumed for collating we need to do that in person ...I say we acted on previous experience and face-to-face is best..." – Participant 40, Interview.*

The students stated that they found the face-to-face communication enabled them to discuss more openly and fully, and provided a richness that they valued for their learning.

> *"I think that because when you make something face-to-face if you do it online you make a point and it's given, it's a yes or no answer but the problem with that is you don't get your chance to justify your answer, explain...you don't get the chance to justify your point or explain why you feel it may be effective or sometimes get the chance to criticise and then you come back and say that and discuss it. I think that when you're making a decision it is good to do it face to face. It gives you opportunity to generate a conversation and improve on your decision". – Participant 1, Interview.*

> *"I think face to face I just prefer it because you can just see what people are thinking more, you can just get a better feeling for what they want to do and they don't want to do and I just think they're more like likely to say what they want in that environment." –Participant 80, Interview.*

This didn't seem to be due to the students not being able to use the technological applications because they were using them in their social lives. As participant 8 described the reason was more that they were 'people focussed'.

> *"Like, I am on Facebook and MSN and those things ....But, yeah, I do tend to use a lot of technology but, yeah, I'm a people person. I like interacting with people rather than machines" – Participant 8, Interview.*

Some students explained that face-to-face produced the best outcomes.

> *"Would like to work with plenty of technology choices, but meet face to face to ensure communication and the work produced is of best standard." Participant 56, Q1*

The students justified their choice of face-to-face by expressing concerns over text based communication.

> *"You can't interact properly over a computer." Participant 8, Interview.*

> *"I wouldn't have liked to do more over the internet and then...I just find that you get much more speaking to someone face to face than what you do over the internet because you can take messages somebody writes in different ways and so...yeah you can pick up on body language and things like that of people if they're not happy with an idea that you might come up with. They might just say oh yeah that's fine when they're not really fine with it and you can tell if you're face to face but you can't over StudyNet so for me it worked better. I'm much more comfortable working like that so erm..." –Participant 27, Interview.*

Use online only when unable to meet face-to-face

The students would only attempt to communicate online if they had commitments that made it difficult to meet face-to-face, for example childcare or sport. Although even then they would try to plan around this if at all possible and meet at a different time. The

students tended to accept this; they simply accepted that if someone couldn't meet it meant that the team didn't meet and discuss.

> *"Well we couldn't work on Wednesday because one of our members has like childcare issues." - Participant 32, Interview.*

Students commented that as they were at UH most days there was no need for online communication.

> *"But it really depended if we were in uni or not because we did, we did kind of say, like on the Monday." – Participant 24, Interview*
>
> *"face-to-face during the day, technology at night where necessary". - Participant 3, Q1.*

The emphasis in the second quote by participant 3 –"where necessary" reflects that for most of the time it was not necessary, as they were on campus and so met face-to-face.

In summary, the students considered face-to-face communication as essential because it provided the high quality social presence that they thought was necessary for co-construction of meaning. On the whole they were on campus and so could meet easily. Where this was difficult they would plan around each others' commitments, only resorting to using a technology online for communication as a last resort.

4.1.3.3 Discussion

The students used face-to-face communication for their co-construction of knowledge. It is recognized that the face-to-face environment provides high social presence (Garrison & Vaughan, 2008) and the participants in my study recognised this. Ausburn (2004) found that students experienced in a blended environment rated discussion online in the bottom rank of features that they wanted provided on an MLE. They suggest that this is because students do not see the online communication as fulfilling the need that is met by face-to-face. That the participants found face-to-face more satisfying is congruent with a recent survey of 520 undergraduate health students in a study by Curran et al. (2008). This study found that students had much greater satisfaction with face-to-face, case based learning than with asynchronous online discussions.

The students' experience of a learning discourse on Physiotherapy has been face-to-face. The students' clinical experience of collaborative working is the classic hospital ward round or case meeting, both of which are carried out face-to-face. The ideas of apprenticeship (Rogoff, 1995) and enculturation (Brown, Collins, & Duguid, 1989) are highly relevant in a professional practice course. The students are used to being allocated to a clinical educator (expert) when on placement in what could be described as cognitive apprenticeship (Kirschner, Martens, & Strijbos, 2004). In past studies (Davies, Ramsey, Lindfield et al., 2005; Hughes & Daykin, 2002) some of the students didn't see using technology as a requirement for their professional role. This was not expressed by the students in my study, and perhaps reflects the changing technological environment (Garrison, Anderson, & Archer, 2000).

The students are studying a professional course and so will see their qualified tutors and clinical educators as role models, and setters of the conventions for the profession. The:

> *"learners are products of their educational experience and as such are used to certain types of education and have been socialised to study, learn and act in specific ways" p. 18 (Kirschner, Martens, & Strijbos, 2004).*

In a study by Lindquest et al., (2004) consisting of interviews of 18 students from two universities, it was found that physiotherapists particularly valued experiences that: *"involved them in interaction, in observation and hands on practice"* (Lindquist, Engardt, & Richardson, 2004). Because the students have chosen to study physiotherapy it is, perhaps, not surprising that they value the human interaction provided in the face-to-face setting.

Only recently have changes in the workplace and professional development suggested that this reliance on face-to-face interaction needs to be challenged. The changes are dramatic and have been going on during the timescale of this project. A recent development by the Chartered Society of Physiotherapy has included the development of online interactive discussion forums called ICSP (www.interactivecsp.org.uk). This only occurred late in the timescale of this study. In addition reorganisation in the NHS resulting in increasing provision of community-based care is resulting in an increasingly distributed workforce that is often reliant on email and online technologies for collaboration. It is only recently that educational establishments are being challenged to consider how we develop students' skills in the use of technologies for communication (Peacock & Hooper,

2008). However, if we are to provide a role model for practice this needs to be in authentic situations such as when the students are on placement (Rickard, 2009) or in geographically different locations (Clouder, Dalley, Hargreaves et al., 2008) when students have engaged in online interaction.

The students' preference was for face-to-face for collaboration and this was, usually, feasible as the students were on campus almost every day. Peacock and Hoppers (2008) study, comparing undergraduate and postgraduate students perceptions of a VLE, found that undergraduate students felt online discussions were not appropriate as their need to be in contact with each other were met by the face-to-face environment. This has been widely found, as reported in a Joint Information Systems Committee (JISC) review (Sharpe, Benfield, Lessner et al., 2005). It seems to have been the case in my study that the situation the students were experiencing on campus didn't create an authentic need for the use of online discussions, although commitments of some of the group's participants on occasions made face-to-face meetings difficult.

Although, by many university standards, StudyNet has excellent facilities and the students were very positive about its use, they didn't have access to synchronous group technology that is not text based. Hrastinski (2008) suggests from his PhD work and a specific study on asynchronous and synchronous learning that synchronous technology provides a better environment for *"personal participation"* and for *"convergence on meaning"*. A few students did use Skype to some extent. Ultimately any technology will not necessarily replace the affordance provided by face-to-face (Suthers, 2006).

There is an important distinction to be made here relating to affordance. 'Usability' is the level to which the system can be used (i.e. the technological affordance) whereas the utility is its functionality (educational and social affordance) (Kirschner, Martens, & Strijbos, 2004). The students found these technologies had 'usability' (for social networking) but they didn't have the 'utility' (students didn't get the interaction they wanted for learning). In particular, students expressed concerns about text based communication. The technologies didn't provide the synchronous, all group experience with high levels of social presence that the students wanted for collaborative learning which is provided in the face-to-face environment.

4.1.4 Inclusivity – must include all group participants

4.1.4.1 Introduction

At interview the students expressed a view that everyone must be involved in decision making, editing and amending work and discussions. Students wouldn't use a technology unless all of the group participants had access to it. The students wanted to include everyone and ensure everyone felt part of the team and were 'happy'. They wanted all members of team to be involved in and agree to decision making at every stage, to be in agreement and to be committed to the decision. This need for equality, democracy and transparency meant that they highly valued and used technology such as the data projector in LG3 where everyone could see the output on the screen. They valued the file sharer on StudyNet for a similar reason; it enabled everyone to have the same access to the group's material.

4.1.4.2 Evidence

Use technologies that all of the group are using –access and availability

The need to involve all group participants in collaboration was expressed repeatedly at interview. For example, participant 60 was quite concerned to ensure that she didn't favour any one in her group.

> *"I'd go onto MSN if I saw people but there was very rarely the occasion that all five of us would be on there and then it ends up being two people communicating and I was...I tried to avoid doing that because it...you know when two people come together with an idea and addresses the group I just...I've never quite...and it's difficult because I live with one of the people in my group. So if we discussed something I'd try to be careful to come to everybody and say oh yeah we was talking about this what do you think rather than I think we should do this. I think it can sort of can cause problems." – Participant 60, Interview.*

If one student from the group didn't have a technology then they wouldn't use it. This occurrence should have been avoided by putting the students in groups based on their expressed choice but in some groups this didn't seem to be the case. As expressed in questionnaire 2, to the questions what influenced your choice?

> *"What everyone has access to." – Participant 58, Q2*

This was also mentioned at interview:

> *"No we didn't use MSN because not everyone used it straight off and not everyone had the Internet where they were living so that was a no go."- Participant 42, interview.*

Similarly if students weren't accessing a technology at the same time meaning that all of the group could participate then it was rejected.

> *"Yeah, because I think it was a case of all or nothing, if we all weren't, you know if we all were going to be on Facebook ..... But because we all couldn't decide that we'd all be definitely on it at the same time, we decided actually it would be a pointless exercise" –Participant 25, interview.*

Use technologies that enhance equality and transparency

They valued the technological applications that gave everyone equal access to information such as the data projector in LG3 and LRC group rooms where they could all see the output, and the StudyNet file sharer where everyone could see all of the information.

> *"StudyNet there .. was no possibility of that [*anyone not knowing*]. Everybody had access to the same material" –Participant 27, Interview*

As mentioned previously, students were very positive about LG3 because of the efficiency of linking to their group site and because the data projector allowed them all to see the group output.

"It was nice sometimes to just have the projector .. slides on the large screen as we did in LG3 so...I thought that was really helpful again everyone looking at the slide, everyone can see it and can just comment on it straight away instead of like peeking through." - Participant 40, Interview

"I was kind of [unsure] at first we're going to use all these like whizzy gadgets and things but it is actually helpful especially in that room just us all sitting round being able to type up something and all have it on a big screen rather than cramming around a little computer that we can't really see and having like the whiteboard where we can write down stuff and everyone can see it instead of us all having to write out erm, ... I was pleasantly surprised at how helpful it was actually"- Participant 9, Interview.

The students found using a data projector preferable to crowding around one laptop because, if they had to do the latter, it meant that they didn't all have equal access and ability to participate.

"It was a bit difficult sometimes because congregating around one computer in the libraries always puts somebody on the outside and it's quite difficult for them to always get their opinions in but we did try and make sure everybody put their stuff forward but you know..." – Participant 27, Interview.

Participant 11 eloquently summarised the difference between the facilities, and how they supported their learning.

"In the group room is much more accommodating for a group but then when you're out in the LRC it is very individual ...the computers are set up so you work individually so that's a problem." - Participant 11, Interview.

This was also reflected in the observational data. In week 8 when a data projector for one of the group's areas wasn't working that group asked if they could use a group room in the LRC so that they could use a data projector, even though this meant they wouldn't have access to the tutor. The importance of the group having equal access to the visual output of the group on this occasion outweighed the advice and support of the tutor available in LG3. This was supported by observational data for example in week 9, all except one group, i.e. 15 out of 16 groups used the data projector in LG3 to display the groups output.

So, the students were very positive about the classroom technologies in LG3 and used them extensively, with 46 students (84%) in Q3 (n=55) saying they used the data projector in LG3 and 35 (64%) saying they used the interactive white board.

This need for inclusivity motivated students to try online technologies, but the experience was not positive. For example, one group had tried to use MSN[3] because a group member couldn't get to a face-to-face meeting due to childcare issues.

[3] Note that this was at a time when MSN was only instant text-based messaging

Participant 60	*"I think speaking to people was, with everything else there like we tried an MSN thing and it was an absolute disaster."*
Interviewer	Ok, tell me about that then. Why was it a disaster?
Participant	*Well it was erm, one of the people in the group because ... he said right I've got my children for the weekend .... We wanted to find a way of getting around it.. I'll log on to MSN and you can pose questions to me and you can tell me what's going on with it but to describe, to write down a whole meeting in a MSN conversation and then get his answer and then read it out to the group we'd gone past what he was replying to and the whole flow of the meeting was just...so in the end I said I'll put up what we've discussed and then you can see the whole thing I said because I'm getting lost in what I'm doing and I was missing the meeting. ...I'm not bad at typing but I'm certainly not quick enough to get it as you speak you know. ...he got frustrated he kept putting question marks up you know what's going on? What's going on? And I was like well I'm trying to write but no...and that happened twice so I just said no I don't think we should do that any more it doesn't work."* - *Participant 60, Interview.*

At interview the students stated that the group's work was not edited online apart from formatting or changing the order of slides. They explained that this was because they needed to discuss it with the group members to explain why they had done this.

> *"Decision making was usually made face to face. There was a couple of times when it was made online without necessarily being discussed between the group and that was stopped quite quickly because one of the slides I'd done was changed online and put into the presentation and I wasn't very happy about it because as far as I was concerned decisions should be made as a group" – Participant 1, Interview.*

Avoiding conflict in the group

Students expressed concern over the risk of causing offence. They wanted the group members to be 'happy' and feel that their work was valued. This also contributed to their rejection of text based technologies for discussion.

> *"When there's emails I think you can misinterpret what's being said and text messages as well whereas in our group we got on so well I think because we resolved things even if somebody was in a bad mood over...on the text message you'll just think somebody's being stroppy and then it would spiral into something which is unnecessary whereas ....we did have little spats of course ... but speaking to each other made it much easier to...when you'd realise it wasn't really a big deal whereas with a written bit of evidence that they've been stroppy it's much more difficult." – Participant 60, Interview.*

"I mean I much prefer to do face to face ... you know we've had messages on the site [StudyNet] which actually if you read them they sound really like awful like are you taking over the group but that's not what they're saying. What they're saying is completely different." – Participant 5, Interview.

"I think we would have broken down as a group had we not done our face to face meetings because I think on occasions there were pure coincidences. You know some people's stuff overlapped and therefore one person's slides got cut... I think it was a good two weeks in a row that the same person's slides got cut down and they got upset about it. You know it was, we didn't really know what to do. It was two people's stuff was overlapping and someone's had to go and you know to fit in with the time.....So if that would have all been done online we wouldn't have known that person was upset and tried to fix it .... someone would bring the biscuits and we'd make sure that we'd sat down and had a little chat about you know how's your weekend or something silly just to break up the working together" -Participant 24, Interview.

There was an exception to this. It was mentioned by two students at interview who were in groups that were going through a period of intense conflict. In these cases, during the conflict, the students commented that they found text communication easier. However, once the conflict was resolved they went back to face-to-face communication.

"I find it easier to write stuff down rather than to explain because I find that nobody interrupts when you're writing and they can read it and spend as long as they want." –Participant 56, Interview.

4.1.4.3 Discussion

In comparison with other studies (Davies, Ramsey, Lindfield et al., 2005) access and availability of technology was not mentioned by many students during the interviews, although access had been identified as an influencing factor in the pilot. A few students commented that they would only use a technology to which the students in the group had access. This has been found by other practitioners:

"the lowest common denominator determines the choice" p13 (Kirschner, Martens, & Strijbos, 2004).

That access didn't seem to be a major issue possibly reflects the organization of groups, putting students who wanted to use a technology together. It may also be due to the increasing availability of technology (Garrison & Vaughan, 2008), (e.g. WiFi has been introduced on campus). If tutors want students to use a particular technology then the issue of universal access needs to be addressed, as this finding suggests that if anyone in the group doesn't have access to the technology then the group will not use it. Recently the issue of access and availability has been addressed in the School of Nursing at UH by giving all students mini laptops. In my study, all but one of the students had their own computer and so this blanket provision would not have been justified in this cohort (although it would have been relevant for the one individual). The issue of internet access

also needs further exploration to see if it is an issue in this student group as it could have a major individual impact. However, it may be that already access and availability are no longer major issues for most students, as has been reported in past studies (Alltree & Thornton, 2004; Davies, Ramsey, Lindfield et al., 2005).

The classroom technologies were highly valued by all the students especially the data projector and computer in LG3 and LRC group rooms as this met their needs for transparency (that all students could see the group output), democracy (they could all participate equally) and they could link online to their group site on StudyNet. The file sharer was used by all groups extensively as they could all see the group output and this gave them the group transparency they desired.

Garrison and Vaughan (2008) suggest that online activities can give opportunities for reflection and greater criticality. They suggest that "the bottom line" is that students are less likely to be critical when face-to-face. This view conflicts with my study as the participants preferred to undertake the "conflict" negotiations face-to-face rather than online, unless there was intensive conflict in which case two students found it easier online. Gulati (2008) also makes the important point that the online discussions can be viewed by tutors whereas the students' face-to-face meetings (in this case excepting the tutorials) cannot. Only one student mentioned that they posted on StudyNet because the tutor might then see the post. However students said in interview they were not using discussion facilities such as MSN or Facebook that the tutor could not see. This suggests

the tutor being able to view the discussions wasn't a significant factor in their reasons for not using online asynchronous technologies.

4.1.5 Purpose - technology is compartmentalised

4.1.5.1 Introduction

The students had clear boundaries between the technologies that they used to learn and the open source applications that they used for social networking. They valued StudyNet highly and expressed the view that this was their educational technology. It was used by all of them regularly. They didn't use their social networking applications for learning, partly because StudyNet gave them what they needed but also because they wanted to keep their educational technology and social technology separate.

4.1.5.2 Evidence

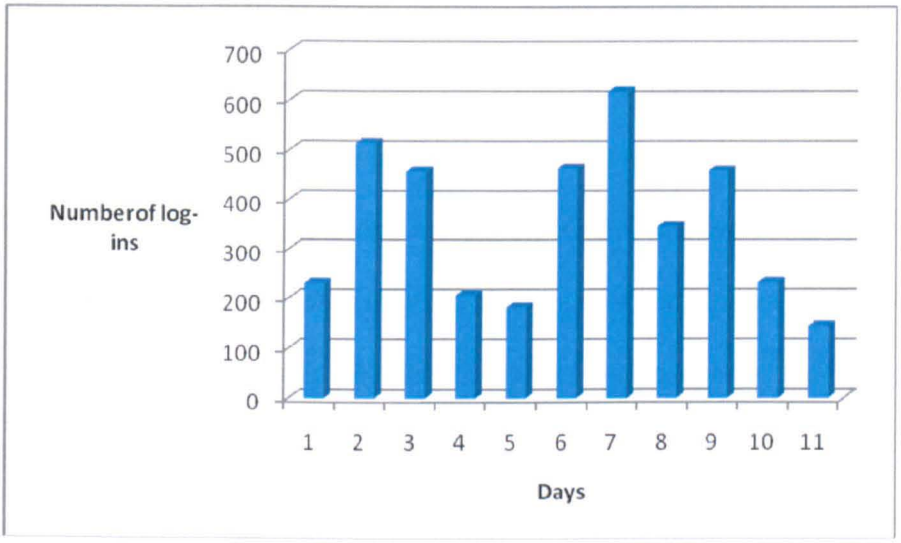
Technology for education

All except one student had their own personal computer and 63 students (73%) had a laptop, so students had personal computing as well as the resources in the LRC.

> *"I mean StudyNet was in use twenty four seven for it. If we didn't have StudyNet I don't really know what we would have done because it would have been too difficult. I don't know what people would have done but yeah StudyNet was in use all the time StudyNet was fantastic. Use it, go on it, 'I don't know how' many times a day you know like all the information you need to know. There was never a point when we had any problems with it at all" – Participant 21, Interview.*

The students valued StudyNet; monitoring data showed that every student used StudyNet, with a high log in rate shown by a sample of two weeks' data during the period they were undertaking the tasks.

Table 6 Log-ins to StudyNet Advancing practice module site



The students were also using social networking sites. Every student who was interviewed was on Facebook, it was just that they saw StudyNet as their educational online application.

> *"I mean to be honest I don't know why we didn't use all these other different things of like Skype because I have all these different things at home and I like using it but maybe, I don't know, I don't know why we didn't, maybe we just kind of, I guess, I guess it's just StudyNet you kind of associate with work." – Participant 41, Interview.*

"Like, I am on Facebook and MSN and those things but I don't use them often because I'm always doing Uni work" - Participant 33, Interview.

They valued the reliability of StudyNet and the confidence that if something was put on their group site the other group members would be able to see it.

"Actually I missed something out earlier, over Christmas we emailed and we emailed about a meeting, and one person we had their email address wrong and they didn't get it and they, they, well I think we put it on StudyNet or phoned them as well so they did turn up in the end. But we were talking about emails and they said 'oh I didn't get that', and so it shows that StudyNet there was no, there was no possibility of that. Everybody had access to the same material everybody was clued up, whereas he could have got really cut out because of that email" – Participant 38, Interview.

Technology for social life

The students interviewed considered StudyNet as part of academic life and a most useful resource. However, they considered open source applications that they used for their social life as separate and didn't want to use them for their learning. Although on the quantitative data 10% of students said they had used Facebook and 20% said that they had used MSN, the interviews suggested that the use of open source was minimal. This data included one group who had set up a Facebook group but they never used it for the module.

Participant 60	*"We set up a Facebook site actually for AP and never used it."*
Interviewer	Why do you think that was?
Participant	*"I don't think it was very useful. If you've got StudyNet there and email as well ... ... much easier. So that was easier." – Participant 60, Interview*

All of the students interviewed expressed a desire to keep education and social technology separate.

> *"Yeah. Kept it separate. It was nicer to have kind of keep work separate from kind of social life because we were all friends anyway so it's quite nice that we kind of dropped our work side and go out and enjoy ourselves so kind of Facebook was that because usually when we text each other it would be bad news that we have work to do or something so Facebook was usually a happy message or..." - Participant 15, Interview.*

4.1.5.3 Discussion

All of the interviewees wanted a clear split between their educational and social technology online. All of the students interviewed used a social networking site in their social lives, the most common being Facebook (www.facebook), with MySpace and Beebo also mentioned. They saw these sites as their social space and so, although one group set up a Facebook page they then never used it for study. Some students thought these sites were too distracting for "work", a finding reflected by some students and academics in a recent review (Armstrong & Franklin, 2008). Their desire for this clear distinction may be

discipline specific and a reflection of this being a professional course. A report carried out by Green & Hannon (2007) entitled "their space" found that some students saw lecturers going onto social networking sites as *"invasion of their space"* whereas others welcomed it.

Given the findings in this study it would suggest that tutors on professional health courses need to be cautious about considering using open source social networking sites for learning and need to respect students desire to keep their online professional/educational and social lives separate.

4.2 Was there any relationship between the students' choice, the blend used and the collaborative learning that took place?

My exploration of the answer to this question was based on comparison of the groups. The key findings of this exploration are:

- Similarities in group process

  Despite organising the students into groups based on their individual preference (putting students together who said that they wanted to work online and use many different technologies), all of the groups used a similar range of technologies and facilities, in a similar staged process.

- Differences between groups

  There were differences in the level of collaboration and interaction in the groups and that is illustrated by comparison of two groups. The two groups I have chosen to

report on are at the extreme ends of a continuum and were chosen to emphasise the difference.

- Learning to become a collaborative professional

Here I report at a cohort level, the students own perception of their collaborative learning. This analysis related to the codes from the interviews and questionnaires.

4.2.1 Similarity in group process

Overall the students in all groups used a similar blend and had exhibited a similar sequence of stages to how they worked each week.

The blend groups used was:

- StudyNet file sharer as a repository
- Face-to-face meetings for collaboration (where possible using a data projector and computer so that they could all see the output and connect to their group site via the internet)
- Text messaging either on mobiles or discussion sites for administrative and 'low level' messages

"I mean we used phones to meet up...kind of arrange meetings and things but, other than that, we hadn't really used anything other than the site [StudyNet] and the LG3." - Participant 33, Interview

So, despite putting the students into different groups based on their own stated preference, they all used a very similar blend of technology (as shown in Figure 19 on page 105). All groups used StudyNet, mainly the file sharer with minimal use of the

discussion facilities, news or blogs. All groups valued face-to-face group meetings for co-construction.

In the interviews the students were given the diagram (see Figure 10, on page 68) to describe how they worked during the week. Using this interview data for the different group's participants, it was easily reduced into the group sheet. To check consistency this reduced data was then compared with questionnaire data and with observation data. The comparison of the student groups revealed that they followed a similar process. This was further confirmed by analysis of group sites on StudyNet. The groups all developed a weekly process that contained a similar sequence of stages. This is illustrated by the two quotes below from different groups.

> *"Got the question, we'd kind of read it on Sunday night, but the first time we met was the Monday and then we took, brainstormed ideas, split the work up, met on the Wednesday, put it all together and presented on the Thursday. Occasionally we would meet on the Friday or after the seminar and plan for the next week. And just, then they'd get the work out, but our normal week's routine was in the tutorial. We'd all have read it and sort of got an understanding of it over the weekend, but in the Monday tutorial that was when we really tried to pull it apart, where are we going to go with our presentation and then delegate out" –Participant 39, Interview*

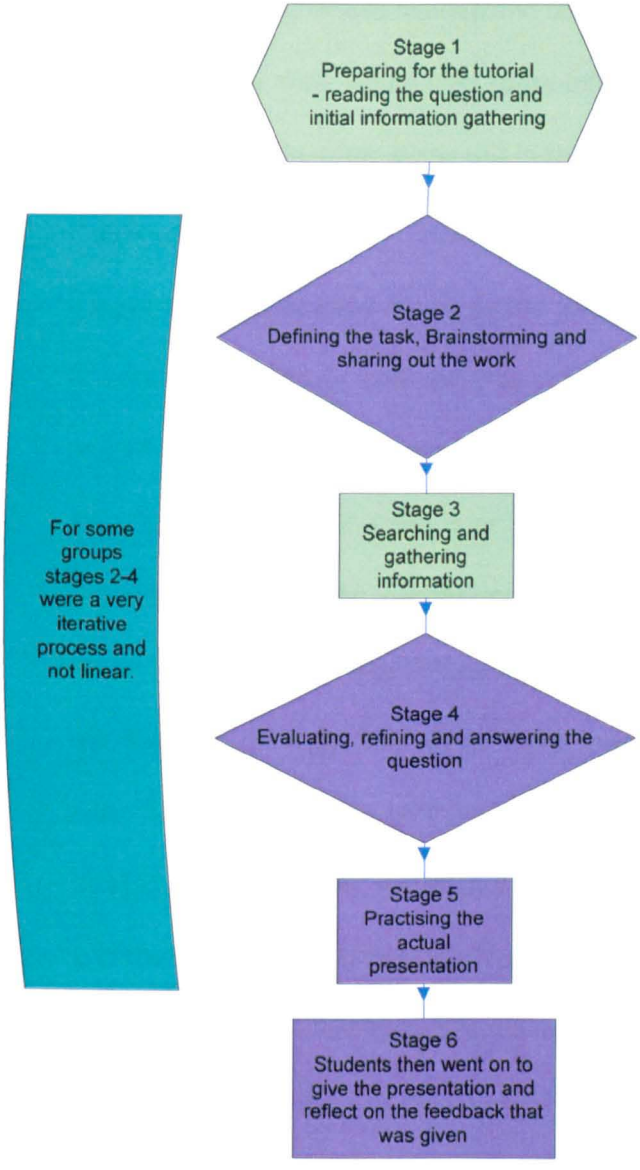
> *"Monday tutorials we erm, obviously sat in our groups. We discussed the question on the day that we had and erm, just put ideas together and then*

divvied out who was doing what for them and we met, sort of during the week. So we'd meet maybe between Monday and Tuesday or any hours we had free we'd meet and just gather the information together for Thursday." – Participant 37, Interview

This sequence can be summarised as follows. Stage 1, before the tutorial some students would undertake some preparation (reading the topic and some reference material). At Stage 2, the tutorial, the groups would brainstorm the topic and collaborate over the meaning, often this led to dividing up the task. At this stage they would also often draw on information from the internet, as well as on the knowledge within the group. They generally produced at this stage some sort of electronic file. This was usually a PowerPoint file, although some groups produced a Word document and others produced a Pdf file of their brainstorming output using the interactive white board. Electronic files were then uploaded to their group site in the session.

Stage 3 was where the students went away and researched the agreed area and stage 4 was when they put together the information and discussed it. Stage 5 was a practice of the actual presentation usually as a group although some students practiced individually as well. Finally they gave the presentation in the seminar, stage 6, received feedback in the seminar and reflected on this feedback. This common process for all groups is summarised in Figure 22.

Figure 22 The stages the students used to complete the weekly task



It can be seen that in undertaking the task the students moved between working individually, cooperatively and collaboratively. Stages 1 and 3 tended to be undertaken more individually whereas stages 2, 4, 5 and 6 were undertaken in face-to-face-meetings and were more collaborative. For groups that worked more cooperatively, stage 4 was

often largely an individual activity producing 'their own slides' although all groups met to revise the presentation remove overlap and discuss findings. For some groups stage 3 and 4 were not linear as they would find some information, get back together to discuss, refine, then search again, often doing this in the LRC.

> *"after the tutorial session what we did, we'd go and sit in the library for a couple of hours, whether it'd be on the computers and just having each taking a section, look into it and see if anything was feasible or if there was no information on it and then we regrouped. And then we split off. I think early on, in the first, was it week 8 or 9, mental health and elderly I think, we actually were in on the Tuesday and Wednesdays. So we did Tuesday and Wednesday and come together as a group and reconvene and sort of put stuff on StudyNet and say how we're doing and I found loads of information. Actually I think this goes with your bit and that type of thing. There were I think in the later weeks, we tended to just come together on the Wednesday and then we came, regrouped, grouped on the Monday, split off, came back on a Wednesday" – Participant 24, Interview*

4.2.1.1 Discussion

The stages are similar to the developmental helical model proposed by Oldfield (Oldfield, 2008), even though this was developed from studying students where the major component of learning was online. The stages demonstrate the complexity of undertaking a collaborative task and how the students used the technology to manage this complexity.

Stages one and three, in which the students individually researched the topic or aspects of it, can be interpreted in many ways. In the situated perspective (Lave & Wenger, 1991), the individuals are progressing along "trajectories of participation". In the cognitive perspective they are constructing knowledge that they can then apply to the question (Anderson, Greeno, Reder et al., 2000). It is important to note that the students who had some knowledge from individual reading prior to stage 2 found the tutorials more helpful, whereas students who came to the tutorial without having undertaken some individual reading or research, identified that they hadn't achieved as much in the tutorial as they would have liked. This preparation could have given them more confidence to participate or more "content" which they could discuss, or potentially both. It led to a more effective learning experience as reported by the students.

The end result of Stage 2 was largely cooperative as the students then took away an agreed area that they then researched, enabling them to participate in stage 4. Often stage 3 and 4 were iterative. Stage 5 and 6 can be seen as participating (Wenger, 1998; Wenger, McDermott, & Snyder, 2002) within the "community" of the cohort. Stahl cited in (Suthers, 2006) suggests that the small group is viewed as key in collaborative mean making and in stages 2-5 the group was the key source of interaction. In stage 3 students were engaging with the wider community through researching generally using the internet. For co-construction and deep learning (Marton & Säljö, 1976) the group was the core source of interaction and this occurred face-to-face.

The online activity tended to focus on engagement with the larger community by searching professional knowledge using the internet (knowledge gathering) whereas the face-to-face contact was more focused on interaction within the group. The students valued the file sharer in StudyNet, which they used between these stages, because it enabled them to view the whole output, testing their individual understanding and identify the "conflict" areas where the individual outputs overlapped or disagreed with others in the group. However, the collaborative model of learning is only shown in stages 2, 4 and, in some groups in stage 5 where:

"groups actually create, share, use and interpret meaning" p68 (Stahl, 2004b)

The students organised their learning to collaborate when they were onsite during the day and to research and gather information when they were off site. Their use of online technology was largely administrative and information gathering.

4.2.2 Differences between groups

The students had been placed in groups on the basis of the technological preferences expressed at the outset. Compiling and comparing group profiles enabled identification of differences in the groups. So, whilst all groups followed a similar overall sequence, there were aspects that differed between the groups:

- The extent that they did the activity together collaboratively in a face-to-face environment, as opposed to working more cooperatively, allocating clear tasks individually and then collating the results
- The extent to which they had set roles and a planned process
- The level of collaboration in knowledge construction

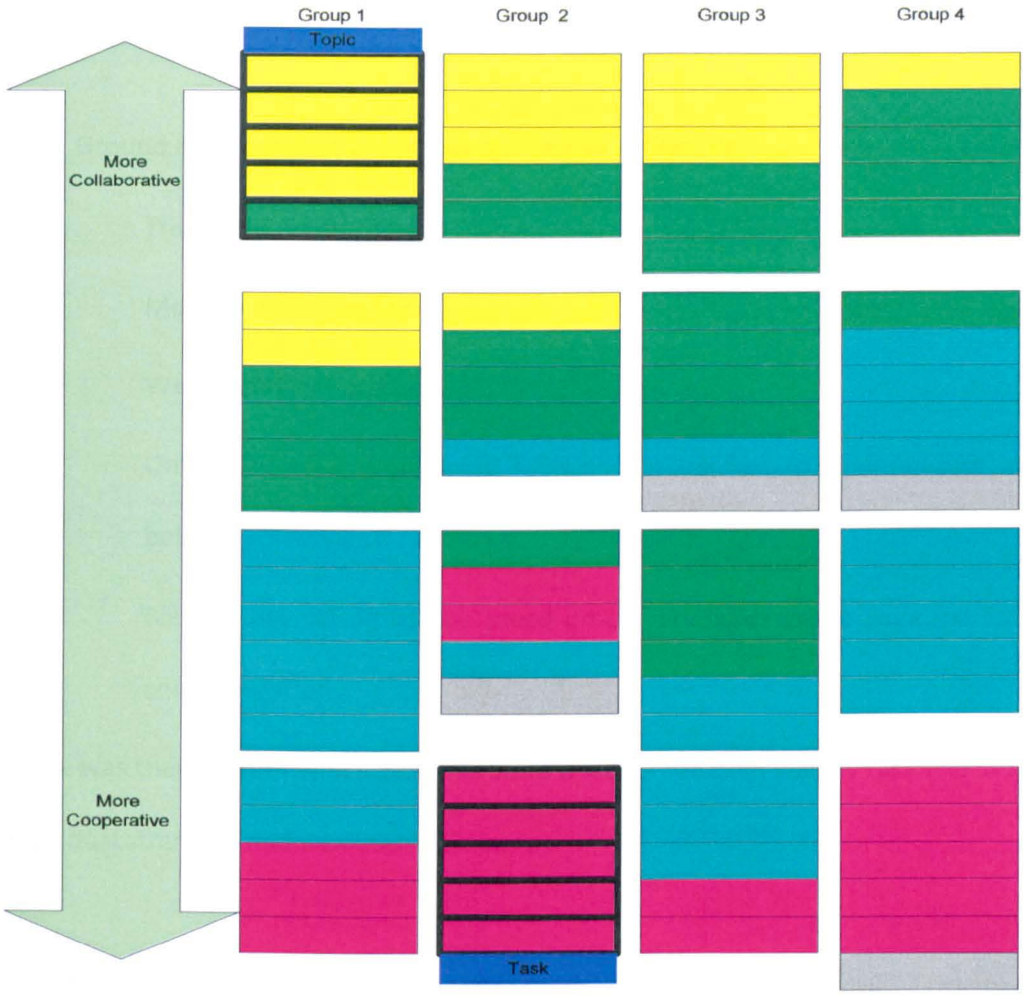
- The group dynamics and, in particular, the extent to which the students expressed that they had gone through a 'storming' process.

In general, the groups that had originally expressed a preference for more face-to-face meetings worked more collaboratively (yellow and green), with more face-to-face contact. Whereas the groups who had expressed a desire to use many technological applications (aqua and pink) for communication didn't use them, instead they worked more cooperatively. This pattern is illustrated in Figure 23.

There was only one group that didn't quite fit into this pattern but this had a different profile from the rest in that it was made up of a mixture of preferences, was an all girls group and had two members of the previous cohort in the group. I have chosen not to describe this group as it is potentially identifiable and didn't fit with the overall pattern of the other 15 groups.

To illustrate the pattern that emerged I will compare and contrast two groups. Both groups consisted of male and female students and a mixture of mature and direct entrant students. I have selected these two groups because they are at the extremes of the continuum. One was made up of very 'high technology' preference students, the other 'low technology' preference students (for explanations of group profiles see Figure 12, page 88). These groups are marked with bold outlines in Figure 23. I have named them 'task' and 'topic' as to give their real group names would reveal their identity.

Figure 23 The pattern of collaboration and cooperation



Group 'Task'

This group was made up of 'pink' - high technology preference students. It consisted of three females and two males. Although this group followed the overall process, they were focussed on achieving efficiency in getting the task done. They set a very strong ground rules contract, actually recording the discussion, and openly documenting their strengths and weaknesses. They had a fixed process that included rotating the leadership for each week. They always prepared for the tutorials by individual searching and reading and

then, in LG3, they would use all of the classroom technology to brainstorm and divide up the task. They expressed what they intended to do in their ground rules contract.

Ground rules contract as laid out on their StudyNet site:

Thurs pm/ Fri morning to plan

Monday put all together

Wednesday pm practice

Online StudyNet group post, MSN and phone text to communicate in between meetings if necessary.

Blend – everything will be saved on our StudyNet group page, txt for communication.

There was then a list of which students were a leader for each weekly task and student's individual strengths and weaknesses.

That they adhered to this planned approach was confirmed by the participants at interview, for example:

"We did a contract and we really stuck to that and we had a leader assigned to each week and it was really nice..... We got the question, we'd kind of read it on Sunday night, but the first time we met was the Monday and then we took, brainstormed ideas, split the work up, met on the Wednesday, put it all together and presented on the Thursday... We found the interactive [whiteboard] really helpful and sometimes we brainstormed, always used the

computer, had the opportunity to get on the Internet" – Participant 38, Interview.

Observation data confirmed that they used the interactive white board and the internet in LG3 but in the later weeks tended to work direct onto a PowerPoint file. They were keen to divide up the task but also very supportive of each other. Their approach reflected what they had individually put in questionnaire 1.

"I like to meet, delegate (not personally but as a group) go away, do our individual work, finally meet up and then practice". Participant 38, Questionnaire 1

"I want to meet in a group that will cooperate in a respectful manner". Participant 40, Questionnaire 1

This group tended to meet in an LRC group room, bringing their own laptops to ensure that they had a computer even if the fixed room computer wasn't working. In general they met for 2-3 hours once a week in addition to the scheduled tutorial, texting in between.

"We'd normally meet in the LRC we'd like book out a study room and that was a little bit hit and miss at times because the computers in the study rooms aren't brilliant. They may not be working so me and another person in the group would bring a laptop pretty much every week.....We would text each other quite a lot saying I found something on StudyNet or I'll put it on StudyNet or I found this ... We would do that because it was quick, it was easy

and you didn't have to wait for someone to go on their computer, look at their emails or StudyNet so it was a more rapid response really." – Participant 42, Interview.

They worked hard on making the process more effective and reducing the time they met, and yet responding to feedback, contacting each other using text messaging between meetings. They posted journal articles and slides on StudyNet they had prepared and used the discussion sites to tell each other if something had been posted on the file sharer that might be useful for *"someone' else's bit"*. They focussed on undertaking the task in a more time efficient way.

"The Wednesday we'd meet, and at first you know it was taking two hours, but by the last week we met on the Thursday morning and it must have taken us 40 minutes at the most." –Participant 38, Interview.

"By the last week, what we were doing is on the Tuesday when we finished our slides and our private notes we copied and pasted them all onto one document, so although they weren't [finished] and we'd think about the order we were putting them in and have a bit of a guess so by the time we got there on the Wednesday or the Thursday morning it was, it was merely just a run through" Participant 40, Interview.

Despite this being a group of students who had expressed that they wanted to use a number of online technologies, all changes to work produced by the group were

undertaken face-to-face, even though for some of the students in this group getting in to UH was difficult.

Interviewer	Changes of other peoples work?
Participant 40	*"Yes.*
Participant	*It happened when we were face to face.*
Interviewer	*Face to face?.*
Participant	*We overlapped here and we'll need to change it. But none of us would have wanted to change somebody else's work without them knowing" –Participant 38, Interview.*

"it's not fair to change someone else's work when they've done it and you don't really know what they meant by it, and also I think that when we were together we sort of come up with really good ideas." - *Participant 41, Interview.*

When they met they were very open to changing and learning from each other, although this tended to be skills focused e.g. using functions in PowerPoint or how to present more effectively. They tended to discuss the process of reducing information and its overlap, rather that the meaning or their understanding. They felt that their group hadn't really had a storming process; they had just got on with it. They stated at interview how they trusted each other and this was confirmed by my observation of their enthusiasm in tutorials in LG3.

Participant 38	*"We just trusted each other and nobody ever let us down so I don't think there was ever a, there may have been a need if it had arisen in the first week but it never arose by the end of the week that somebody didn't do anything so it was fine."*
Interviewer	So there was quite a lot of trust in the group?
Participant	*"Yeah, loads. I mean sometimes it didn't go up until five minutes before we were going to meet but you just trusted that they'd to do it" – Participant 38, Interview.*

Observation notes week 9 –tutorial LG3.

Very keen working together, enthusiastic all students participating.

Using IWB turned on as soon as got there

Observation notes week 11- tutorial LG3

Spent some time fiddling around with colours and animations on slides.

When reflecting at interview the students demonstrated some insights into how this way of working had impacted on their learning.

"I think it was a very task focused way of working. Obviously we always got the work done on time. Erm, I don't know if it's the way of working that produces the best results in terms of depth and consistency of material. It's definitely a conveyor belt type or working." –Participant 41, Interview.

"I never really fully achieved a sense of really mastering the topic as a group but I think again we used a really task approach, task focused approach and it was all about banging it out and just having it ready and do well and we fell a victim of this sort of task focused mentality" ..... *"I think actually perhaps sometimes we've been a bit hasty splitting up work. We really having taken the time to really truly understand what was required so then we ended up having the work split up and as I was doing the work I sometimes felt well we kind of lacked a bit of a vision, a common vision and we split up the work so much that it's like person A's doing A, person B...and when we came to the end it was more a case of trying to collate the information together." –Participant 40, Interview.*

Despite that these students had said that they wanted to use technology in year 2, they used principally StudyNet as a repository, with only minimal use of other online technologies.

"I think, I vaguely remember one message to one of my group members on Facebook but really just because somebody was on there and they just saw it and put in kind of PS AP related information but not to organise a group meeting or anything significant. MSN no." – Participant 38, Interview.

This was also demonstrated in questionnaire 3, responding to the questions about the use of technologies.

Question: What technologies have you used and what for:

Ticked and commented on the following;

Interactive white board in LG3 – brainstorming disseminating workload

StudyNet group site – sharing info, discussions*, files,

Mobile phones – arranging meetings

Participant 41 Q3

* note they actually had only 12 threads and 13 posts (group 14 in Figure 19)

Participant 41 described their approach as:

"a conveyer belt type of working".

In summary, this was a group that made decisions face-to-face but worked quite cooperatively. Although they made full use of the classroom technology they used text-based online communication largely for sharing basic information. This groups average mark in the in the exam was 55.5 %.

Group 'Topic'

This group consisted of 1 male student and 4 female students; of whom 4 had been allocated as 'yellow' and 1 as 'green' (students who wanted to use mainly face-to-face communication). There was a major focus in this group on learning about the topic. In the ground rules contract there was less clear task allocation; they didn't assign leader to each week and they reported working together extensively. They tended to work through dialogue rather than adopting individual roles and tasks.

Ground rules contract

Question: How going to work?

Face-to-face and online

Organisation

Explaining to each other and talking about what we are looking for

Working together

Sharing info

Talking lots and explanation

Sharing /communication

"So yeah not so much a leader. There definitely wasn't like a definitive leader each week but it was, I think it was just a case of who understood because I think in the mental health week, that first week that we did it, four out five of us didn't have a clue but one person did and they pretty much took over But there wasn't a natural leader in that sense, it was a case of all of us working" – Participant 3, Interview.

This approach of working together for learning was expressed in Questionnaire 1.

"I like face-to-face (so we can share (swap / explain work)...I expect everyone to listen to each others ideas and be committed". Participant 4, Q1

The students in this group did little preparation for the tutorial and so spent some of the time in the tutorial discussing the question. This preparation differed in the 'high' collaborative groups; some did prepare and some didn't. Observation and interview data showed that they didn't use the interactive white board but did use the data projector and the computer to make notes in a Word file or on PowerPoint, or to make notes on paper. Two of the students later questioned whether they had made the best use of this room, although they liked the facility.

> *"Ok, well I guess when we came together on Monday at the tutorial it was really the first time that any of us had really had a look at the case scenario. Erm, the problem with that being is that everyone's bringing ideas to the table for the first time. They hadn't really thought of...it was quite a spasmodic thing do you know what I mean? There was no real definitive way we wanted to go. So that Monday session was basically spent throwing ideas down and trying to come to some kind of conclusion by the end of it but I don't really think it was that well structured for us... we didn't use the whiteboard" - Participant 1, Interview*

Observation data week 8

Lots of discussion didn't break down the task until near the end. Used Word and data projector.

Observation week 9

Strong group used PowerPoint, Internet Participant 1 on computer trying to get some agreement although intense discussion, constant checking with each other.

This group had many face-to-face meetings, meeting every day, and spent considerable time discussing the content of the presentation.

> *"Sometimes it felt like AP was all week, you know we literally met in every tiny little slot and you know came in and did the presentations and stuff. But face to face I always find really useful when you've got information"- Participant 2, Interview.*

Interviewer	So how long was each meeting then?
Participant 5	*"Probably two or three hours especially on sort of the Tuesday and Wednesday when it was the information gathering together and putting the slides together just because it seemed it was necessary to do it. That was because otherwise you never got enough out of everyone having met and because we had people who had come in and whatever and you don't always have lectures on that day you would need to come in for a substantial period of time to make it worth having done the journey in" – Participant 5,*

This group were working between stages of the process in an iterative way, searching and then discussing and refining their arguments and evidence.

"After the tutorial session what we did, we'd go and sit in the library for a couple of hours, whether it'd be on the computers and just having each taking a section, look into it and see if anything was feasible or if there was no information on it and then we regrouped ... We didn't do it like [some] other groups [we] did it more sort of collaboratively. So we'll all sit round a computer and write all the slides together. Other people might go to a different computer and bring stuff back and we'd collaborate together on the overall look because we found it was the only way of doing it."- Participant 3, Interview

There was a high attention to detail and the achievement of a high standard. They pursued divergent ideas. For one student the level of divergence became a frustration and so this student tended to try and regain control by taking control of the computer when they met.

"Because they were in danger.. they were in danger of completely losing the plot. They wanted to see this website, they wanted to see that website, they wanted to go here, they wanted to go there, they're not really getting anywhere so we thought it was important that someone had to reign them in and say look this is what we're trying to do lets make sure we don't stray so you know that's where I thought I had that...by controlling the computer you control some of the power of the group which all the time kind of stopped them from drifting too much." – Participant 1, Interview.

This group used StudyNet as a repository in a systematic way, with folders for each week organised to support their learning.

> *"StudyNet was just basically used to collate information. We put all our information regarding...our slides would go on there but then everyone put on information regarding journals they'd find or interesting articles they'd find on the internet anything that was pertinent to our topic that would go on StudyNet so it became a learning resource for us as well. .... I know certain people in other groups and they just put slides up there. I think our group uses a proper learning resource and it really helped us when it came to doing the exams at the end because it was just all there for us." – Participant 1, Interview.*

They used texting and mobiles to keep in contact, between their meetings.

> *"Really only use texting when it was to organise meeting face to face you know." – Participant 5, Interview.*

Although these were technologically competent students who were using open source software socially, they didn't use it for study.

> *"We decided that there were some people that live on Facebook and some of us had Skype ...we decided Facebook and things like that would be too distracting and you'd get into too many other conversations." – Participant 2, Interview.*

"They all are on Facebook and they're all my friends on Facebook but there was no need to communicate for... advancing practice." – Participant 3, Interview.

The students in this group were very reflective in their learning about the topic, and they all talked about how they discussed the topic and used each other to build their understanding. After the presentations, one member of the group would compile the files from StudyNet into a learning resource for the group. This was something the group decided to do to support their learning, it was not required as part of the task given to them.

StudyNet – "Even if we didn't think it was that relevant you put it up there, highlight the area which you weren't sure about, little note on it saying discuss what do you think guys, have a look at it get back to us and if they thought it wasn't relevant then we didn't put it in but it was a good way of learning from four other people what actually is relevant to the topic and what's not....It gives you opportunity to generate a conversation and improve on your decision and improve on things you're trying to come to conclusions on because if someone can be critical of it and you can answer back it's only going to strengthen it but if they're critical of it and you find there's a problem with it, a flaw then you go a different way... anything that required a little more depth we'd look into together." – Participant 1, Interview.

Regarding their learning resources – *"I think generally across the board talking to people in other groups they kind of wished they'd done it you know and I was like all my group had by week twelve when we'd kind of done it all they were like oh that would have been a good idea we should have done that. one of the learning points definitely" – Participant 3 , Interview.*

"So the face to face meetings were really good because if you didn't understand then hopefully someone else in the room would." –Participant 2, Interview.

There was some conflict in the team, and one student described how they initially didn't trust everyone in the group, but by the end they had achieved trust between each other. Again this was focussed around their learning and making sure that they had a deep (Marton & Säljö, 1976) understanding. They were positive about their collaborative learning in their group at interview and in Q3.

"I think people are quite sceptical of we're saying this or do I really understand what they're saying or should I go up and read up about it. I know a couple of members in my group had this real big personality clash and one person would say something and the next person would disagree and say what you're saying is not right. I know myself there was a single member in my group who I pigeon holed, I stereotyped even and I thought to myself anything she's done I don't really think it's going to be relevant. I'm not sure what she's saying is correct. So again I'd have to go away and read up about that..... We didn't

feel confident with each other but that's something I guess that's come with time though because now we're working together and we...I feel a lot...I can trust the girls with most things. I'd be happy to let them go away and do something and then come back with their findings. I'd be happy that's quite a conclusive finding. I could use that." – Participant 1, Interview.

In summary, this group met frequently and worked in a more collaborative way, but used StudyNet as a repository. They liked LG3 although they didn't use all of the facilities. The average group mark in this group was 66%.

Representativeness

These two groups were at the opposite **ends of the continuum** and I have chosen them to illustrate **the difference**. The pattern of these two groups was reflected in other groups, with cooperative groups being more focused on getting the task completed efficiently and collaborative groups more focused on learning about the topic. A proposition could be that the groups that initially expressed a higher technology preference were actually using online technologies more for collaboration, instead of extensive face-to-face meetings. The advantage of having many sources of data enabled this to be explored and a more complete picture to emerge. This was not the case on StudyNet, as can be seen in Figure 19 on page 105. This shows that there were very few discussion posts on StudyNet and analysis of these posts shows that they were not discursive but informative (e.g. about meetings times). All of the groups' use of StudyNet was similar. It might be that these students were using a different open source technology (e.g. Facebook), but the Q3

data and the interview data didn't support this. Instead, as supported by interview data, these students tended towards more cooperative rather than collaborative working. So the major difference in the groups was in the level of the interaction between group members in face-to-face meetings, rather than the blend that they used.

In summary the key differences in the groups are shown in Table 7.

Table 7 Summary of differences between these two groups

	Task Group	Topic Group
Ground rules	Very structured clear roles assigned and a definite process	Less clear roles worked through high levels of dialogue and negotiation
Stage 1	Individually looked at question before coming to tutorial	Tended to start looking at question together in tutorial
Stage 2	Used classroom technology in LG3 to brainstorm question and divide up the work	These stages were an iterative process often working together or next to each other on computers in the LRC Created a learning resource on StudyNet
Stage 3	Undertaken individually but if they found information helpful to others they would put it on StudyNet	
Stage 4	This was largely a matter of collating the slides which had been started already on StudyNet	
Stage 5	Practised this together face-to-face	Practised this together face-to-face
Stage 6	Presented	Presented
Blend	Generally a 2 hour meeting in addition to tutorial each week, they used StudyNet to upload slides and met in group rooms.	Met every weekday often for 2 hours. Used StudyNet in a systematic way to support their learning.

Collaborative learning	Mainly learning 'skills' from each other. There was some co-constructing of meaning in initial brainstorm but apart from this focused on getting task completed.	Very focused on learning about the topic and discussing the topic. Saw each other as a learning resource and to help co-construct meaning, especially after initial storming.
Group dynamics	All very positive about group, no storming process apparent. Trust each other to do the work.	Some conflict in the group initially but by the end were very positive about their group
Focus	Getting the task done efficiently	Learning about the topic
Average result	55.5%	66%

4.2.2.1 Discussion

There were differences in the accomplishment of the task in the groups illustrated, the group task being at one end of the continuum and the group topic at the other. The students that chose more technology in their original preference didn't use technology online for group interaction, instead they tended to work more cooperatively than collaboratively in a "group investigation" mode (Jarvela, Hakkinen, Arvaja et al., 2004). The task aim was for groups to achieve high levels of interaction, what Oldfield (2008) defines as Collaboration (level 4) or Collectiveness (level 5) and yet some groups were only reaching Cooperation (level 3).

The students who chose high face-to-face contact saw their colleagues as essential to their knowledge construction, to *"generate a conversation"* over meaning, a "deeper" approach to learning (Biggs, 2003; Marton & Säljö, 1976). It might be that the students who chose high face-to-face contact, were self selecting and those who had a "deeper"

approach and / or "participatory" view to learning chose to work more face-to-face. In a study by Van Eijl, Pilot, & De Voogd (2005) the students were given the choice between working individually or collaboratively. The "high performers" tended to chose to work collaboratively; in the pilot for this study the students with strong academic records were more positive about collaborative learning. It could be that in my study the students who chose more face-to-face contact were the more academic students. In the results the average for group 'Task' was only 55.5% compared to that of 'Topic' which was 66%. However as this didn't relate directly to my research questions I have not explored this further in this thesis.

The students who had said that they wanted to work more online were perhaps limiting their level of collaborative activity from the start. Their intention and concept of the task was to produce the presentation by collecting information individually and cooperatively putting it together. They were increasing the distance from participation, focussing on the task. Taking the participatory view, the PowerPoint electronic file is purely an "artefact" of the learning; the understanding has taken place in the dialogue and socio-conflict that has lead to its production. Offir et al (2008) found in their study, where they interviewed and observed computer students in asynchronous and synchronous environments, that high ability students were most able to overcome the transactional distance of online learning. They suggested that distance learning requires more autonomy from the student and for them to have high levels of cognitive ability and critical thinking (Offir, Lev, & Bezalel, 2008). In a study by Van Eijl et al (2005), the high performers chose to collaborate and work face-to-face more. If this is applied to my study, then conversely it is

possible that the less able students who would have benefitted from synchronous face-to-face environment and working collaboratively worked more cooperatively.

My findings suggest that the group Task, where the students used a more cooperative approach to learning, tended to focus on "acquisition" skills rather than "complex negotiations" (Stahl, 2004b) over meaning. That is not to say that cooperation is not an improvement on unidirectional instruction (Suthers, 2006). The students in the group Task saw the group as a support for their individual learning and for undertaking part of the task rather than as intrinsic to learning itself. Students described this as *"a conveyer belt type of working"* (participant 41) and that they *"collated the information together"* (participant 40) with a focus on getting the task done quickly - a surface approach (Biggs, 2003; Marton & Säljö, 1976). This suggests that these students didn't see a need to meet more often. Although beyond the boundary of this case study, this may reflect the final individual summative assessment.

This contrasts with group Topic where the group members were both "resources and challengers", giving guided participation to their peers (Rogoff, 1995). Through experiencing the socio-conflict of differing views through an external focus (Vygotsky, 1930/78) group Topic developed new understandings that they then internalised. The students were, through iterative participation in the stages of the process, challenging each other, reflecting on different perspectives and through this process creating a common perspective, what Suthers (2006) would describe as an inter-subjective meaning.

The difference of opinion provides the conflict required for learning (Piaget & Inhelder, 1969), with peers creating the ZPD (Vygotsky, 1930/78) for each other.

Group dynamics are also a key aspect in group working. Again there seemed to be differences in the groups, with the group Task not describing a storming process (Tuckman & Jensen, 1977) whereas group Topic did. The group Task didn't describe a storming phase and may reflect the identity and agency of the students in these groups. Identity is constructed through interactions with people (Sfard & Prusak, 2005). It is interesting to note that the group Task did use discussion when they were in LG3, an environment where there was a tutor and perhaps more support. In a study on computer supported collaborative learning by Lizzio & Wilson (2008), students who didn't participate in team building were focused on getting the task done and minimizing effort. They suggest that students who didn't participate in team building activities were 'risk adverse' with a 'weaker sense of academic efficacy' (Lizzio & Wilson, 2008). Gulati (2008) suggests that students who feel isolated may chose:

> *"individual silent learning over discursive social engagement" p188*

In the Task group the clear delegation of parts of the tasks and strong individual roles minimized the need for discussion and higher levels of interaction associated with "deep" learning (Biggs, 2003; Marton & Säljö, 1976).

To accept online working there needs to be trust (Gulati, 2008; Strijbos, Kirschner, & Martens, 2004). There was some evidence that trust was an issue in some teams,

although both groups could be described as having high group dynamics (Clouder, Dalley, Hargreaves et al., 2008). The groups' first week was focused on group development activities but these (e.g. the ground rules contract) all took place in the classroom setting and so may favour development of students who wished to work in a face-to-face environment. Although, when first establishing a group it is best for them to meet face-to-face to support development of group identity then to move more online (Garrison & Vaughan, 2008). The group Task talked about having high trust in their group but they described this as trust to do their part of the task, whereas the group Topic talked about trust more in terms of knowledge construction. Two students from groups that had a high face-to-face contact said one of their personal reasons for meeting initially in the first few weeks was to check that their peers were actually doing the work. This is a similar finding to Davies et al's study (2005) where students met face-to-face when there were perceptions of unequal contributions in the group. Although students could see when files were added there was no other way of them knowing of the activity levels of their other group members and comparing this to their own, which some authors (Boyle & Cook, 2004) suggest may be an important social affordance. The students didn't use the Wiki where contributions are more transparent but this perhaps reflected the task (which was a presentation, not a collaborative written piece) as Wiki's are more designed for collaborative writing.

4.2.3 Learning to become a collaborative professional

Despite there being differences between the levels of collaboration in the groups, from the interviews the students expressed that they saw working collaboratively as part of their practice. Some students had expressed this from the start in Questionnaire 1.

"I feel that a number of people will aid in my development." - Participant 1, Q1.

"Get to share ideas and information to gain the best knowledge possible." – Participant 74, Q1.

"I think it is a necessary aspect to gear us for future life and jobs as interaction between different people is inevitable. So this group activity is, I believe, an important part of our learning." – Participant 76, Q1.

Some students were very knowledgeable about group work (able to quote theory). They made statements about how they learnt from each other, in some cases referring to 'skills' and in others 'knowledge and skills'. All of the students who were interviewed felt that their learning had been enhanced by the group working and even one of the students who, in year 2 had been very concerned about the group working was now positive.

"I thought I was going to be quite individual in terms of...because that's how you always are when you go through school .... you work as an individual and stuff, so working as a team completely changed things and I when I think we put down on the choices I thought ok yeah I'm quite happy to work as a team. I like people, I like team working but I thought very much more I would prefer to work on my own and yet by the end of it I think you change because you go though that team process type of thing and sort of that norming, storming because by the end now it's like you know even if you've got a problem you actually become to rely even if it's not anything to do...like now you know if it's

not anything to do with AP you very much like ring up somebody who's in your group because now you feel that they know how you work and you sort of have people and you can see the different strengths and weaknesses in people and you get to rely on other group members" – Participant 21 Interview.

I interviewed one student (participant 20) who had had considerable difficulties during the year. Tutors had been involved as she had struggled to work within her group. She was from the tutor's point of view, in the most dysfunctional group in the cohort. My expectation when I interviewed her that she would be very negative about her experience and for that reason I was very pleased when she volunteered. I had been concerned that I might only recruit students who were positive about collaborative learning. However she was analytical and reflective and at the end she still stated that she valued working with others in her learning.

"I think we went through the storming phase up to almost about now. I think it's fair say absolute hell really throughout from September and I've been in floods of tears, probably as everyone else has throughout stress....I'm very very much an individual person...all the experience then it's not just in a book. It's not just focussing on one thing because then you can draw on other experiences and it can help improve like I'm going to meetings with people this is better rather than just sitting alone and I gain experience" - Participant 20, Interview.

The students valued each other and saw each other as important to their learning, with learning from peers mentioned strongly in every interview. Students valued different views.

> *"I think that when we were together we sort of come up with really good ideas. When you're by yourself, you just, you have all your ideas and you think that's right but when you're with someone else or someone sort of convinces you it makes you think yeah....." –Participant 41, Interview*

> *"There's one person in our group it's quite interesting actually he thinks very differently compared to us and that's something you know at first it was a bit like what are you talking about? Why? I don't think that's right. But in the end we actually realised that he was seeing things that we didn't see .... now I can actually [see it] and if he raises something then I'm like oh yeah I can now see it and it would be something that would completely go over the rest of us. So it was really good having say somebody different"- Participant 21, Interview.*

> *"I think anybody could say that they just developed skills and I certainly did." – Participant 38, Interview.*

Some students were quite explicit in stating that they had a role in their peers' development.

> *"Well I've got, I'm quite proficient on it [PowerPoint] because I've got previous experience of PowerPoint and sort of being able to sort of edit and format and move things quite quickly but I was really conscious that I didn't*

want to sort of dominate because they wouldn't learn either" –Participant 48, Interview.

"I think in some ways we brought out the best in each other, like that one of the girls hated presenting but she still presented every week, because we kind of told her you know you've really got to,. And she wasn't as bad as she thought, you know she was. We gave her instant feedback but when we sort of sat down in the lesson just before the presentation, we really were quite, you know, sort of good little team, and sort of everyone checking" –Participant 25, interview

Many of the students commented on the sense of positive achievement they felt from working in the group and said that their initial concerns about working in a group had not been realised.

"I definitely changed with what I initially thought at the beginning of the year and saying that I was one of those people that was not really wanting to do group work and then by the end it's actually been ok. I really enjoyed it... it's only when you've sort of done it for a certain period then you look back and think actually I've completely changed as a person now as well in terms of the way you work and stuff but I think it definitely had a good effect." – Participant 80, Interview.

Many students were quite reflective at interview, thanking me for interviewing them, as they had found the interview and the opportunity to reflect useful. In all of the interviews (pilot and main study) only one student said that they didn't value collaborative learning (this was a student in the pilot). It is interesting to note that this is a student who had failed clinical placements and ultimately didn't go on to practice as a Physiotherapist. So, by the end of the module students felt prepared for the collaborative demands of practice.

> *"we need to be able to do this [learn and work in a team] as a physiotherapist, at the end there was sense of relief – I can do it! I can be a physio! - it was great that you could do it here [UH] where you have the support, rather than in the NHS" -Participant 4, Interview.*

4.2.3.1 Discussion

All the students who completed the module met the specified learning outcomes for the semester A and all passed the assessment. They had therefore "constructed" the knowledge required to complete the assessment. The students from the groups who worked more collaboratively with a deep approach (Marton & Säljö, 1976) clearly saw the importance of interaction in their learning. They valued the difference in interpretation and saw this as positive for their learning. The students created zones of proximal development (Vygotsky, 1930/78) for their peers, with their different perspectives.

But there was, perhaps, more to the students' development than that specified in the learning outcomes. This may reflect their identity and the participation metaphor (Sfard, 1998). Through participation they seemed to have changed in their understanding of

"self" (Handley, Sturdy, Fincham et al., 2006), both as individuals and through what could be described as their movement towards their professional identity. Some students who had come to the module with negative views on collaborative learning changed their view through experience, which they expressed as a change in themselves. Whilst this change cannot purely be attributable only to this module, it was stated by some students at interview in the context of asking them about the Advancing Practice module. For example:

> *"you look back and think actually I've completely changed as a person"*
>
> *Participant 80, Interview.*

By the end of the study the students saw themselves in their professional role; they had, through participating in their academic experience, moved from a "legitimate peripheral participant" to see themselves as a member of the physiotherapy "community" (Lave & Wenger, 1991).

> *"I can do it! I can be a physio!" - Participant 4, Interview*

Collaboration is important for the profession and for continuing professional development. That all the students saw collaboration as an important aspect of practice should be recognised. The tension is with the affordance of the technology that needs to be addressed if this collaboration is to continue into the online environment.

Chapter 5. Discussion of the Implications for Practice

5.1 Introduction

The previous chapter has reported and discussed specific findings that emerged from the data. This chapter will discuss the implications of these findings for practice.

The aim of this study was to explore the students' experience of choosing and using a blend. Despite organizing the students into groups based on their technology preference all the groups seemed to use a similar blend; face-to-face for interaction (where possible using classroom technology), file sharer as a repository, minimal use of collaborative technologies on StudyNet and mobile phones for organizing meetings. What did differ was their amount of face-to-face contact, with some groups being more task-orientated, working in a more cooperative way and taking a surface approach, and some working collaboratively and focusing on learning about the topic.

What are the implications of this to group formation? Given that the aim is to promote collaborative learning, organizing groups based on the method used in this study would not seem advantageous. It appears to have resulted in grouping together students who adopted a more surface approach. The solution seems to be to provide greater opportunities for collaborative interaction to promote a deep approach to learning, whilst recognising that there are cooperative and collaborative stages to undertaking learning tasks. This I suggest can be achieved by providing a technological environment and

supporting students to develop abilities in interaction both on and off line so that they can participate more in co-construction in undertaking collaborative tasks.

As Bower (2008) states, by understanding user needs through studying the students' experience, we can select and provide technologies both in the classroom and online that support a particular group of students, in undertaking a specific task. With the changing affordance of technologies due to IT development and with the diversity in the student population this must be an ongoing and iterative process.

I will discuss the implications using the following headings:

- Students' experience through the programme
- Online technological applications
- Classroom technologies
- Scaffolding of collaborative learning
- Wider professional implications.

5.1.1 Student experience with collaborative technologies throughout the programme

Students thought that they would use more technology than they did; they were enthusiastic about the classroom technologies but largely rejected the online environment for interaction. This finding is congruent with a number of recent conference presentations which suggest that despite students using technologies in their social lives they don't necessarily want to use them for learning. Kennedy (2009), in a conference keynote described research findings which challenge assumptions that

students entering education want a high technology education and that the integration of Web 2.0 technologies is straight forward. This was further supported by other research (Beetham, 2009) presented at the Higher Education Academy (HEA) Conference. This concluded:

> *"Students are looking for study practices that have a long academic tradition, despite the very different information environments in which they have to make those practices their own"(Beetham, 2009).*

In this programme students had not been *required* to participate in online discussions using asynchronous technologies anywhere in their programme, although they had been encouraged to do so. Given the developments of ICSP (www.interactivecsp.org.uk) and the increasing use of email for communication especially in community trusts, the use of collaborative technologies needs to be addressed in the curriculum (Peacock & Hooper, 2008). Whilst a significant proportion of physiotherapy professional learning and practice is face-to-face we need to provide opportunities to develop online collaborative learning skills; there needs to be a balance. It may be that these opportunities are better created early in the students' studies, rather than in their third year, as was the case in this study, when they are concerned about their degree classification. However, these students were able to evaluate technologies and the impact on performance and achieve sophisticated ways of working. If their curriculum was to provide opportunities to experience these technologies in a structured way this may better facilitate their use. To some extent, with the introduction of Wikis in the first year (Anders & Thornton, 2009), the programme is already changing, although such changes would benefit from greater coordination

throughout the programme. Authentic use of such technologies should also be considered. Introducing opportunities to set collaborative tasks when students are off campus, for example, may be more authentic to their practice, than when on-campus, as has recently been initiated by Rickard (2009).

That some students took a surface approach to their learning suggests that we need to explore students' understanding of collaborative learning, set higher expectations for this and provide strategies of development that are student-focused (Trigwell, Prosser, & Waterhouse, 1999). Both technology use and collaborative learning need to be integrated throughout the programme to ensure students develop the skills required for their future professional practice, ideally in formative assessment to encourage experimentation. In particular, there is a need to develop opportunities in authentic situations (off-site placements) at level 1 and 2 in formative work for students to experience using online technologies for collaborative learning. My recommendation is to:

1. Review collaborative learning across the programme to create an overall progression and to create opportunities for students to experience different communication technologies for collaboration

5.1.2 Online technological applications

The findings from this study show that affordance needs to be viewed in the social context and related to the user. Whilst technologies may be designed to be used for collaboration, their use depends on the perception of the user. In considering the technologies available to the students, "blogs" may have been perceived as away to record the reflections of a lead author and, as a result, students didn't use them for group

work. The Wiki could have been used to write presentations collaboratively but these students' past experience was of producing PowerPoint files for StudyNet. Perhaps given the time pressure working on a PowerPoint file seemed a more efficient approach. The asynchronous discussion sites didn't provide the synchrony, inclusive group experience with high levels of social presence that the students wanted for this task. Only the face-to-face environment seemed to meet the collaborative interaction needs of the students in this case.

None of the groups used technologies online for interactive communication and thus, when not working face-to-face, resorted to individual and cooperative ways of working. There is an important distinction to be made here relating to affordance. The students found these technologies "usable". They were in the main using them for social networking but they didn't have the "utility" that the students wanted for interaction for collaborative learning. Gaining a rich understanding of this aspect of students' experience enables us to focus on which technologies might enhance their experience.

Ultimately any technology will not necessarily replace the affordance provided by face-to-face (Suthers, 2006) and so where the students have a choice they will usually prefer face-to-face. The situations in which the students expressed a need to communicate online were in the evenings and at weekends, or when their commitments (e.g. childcare), meant that they couldn't be on campus. A synchronous technology, perhaps voice based with a visual facility using webcams (e.g. Elluminate), could provide an opportunity for interaction in this situation and may meet the students' requirements for

inclusivity, quality and time efficiency. Although, by many university standards StudyNet offered excellent facilities and the students were very positive of its use, it doesn't provide access to synchronous group technology that is not text based.

There is only one study, published in two articles, that has evaluated a synchronous voice based technology with health students (Carbonaro, King, Taylor et al., 2008; King, Taylor, Satzinger et al., 2008). The students found Elluminate easy to use but even with this technology, they could not speak simultaneously and found the turn taking challenging. This meant they found it harder to make decisions online. So even technologies such as this would probably still be an adjunct to their face-to-face meetings but could enable interaction when students cannot meet face-to-face and enhance interaction. Elluminate is only one technology of several that are now becoming available and which offer a voice-based, synchronous experience. MSN now has a voice and video facility, although in this study the students wanted their educational and social technology separate and so may be reluctant to use MSN. The BLU unit has been doing some work piloting the use of Elluminate at UH but, to date, this has largely been in tutor-led sessions rather than student groups. It is an area that requires further development and research to determine if such a synchronous voice-based technology could support health students in online collaborative learning by enabling them to maintain inclusivity when group members are off site. My recommendation is to:

2. Explore the use of Elluminate or similar synchronous voice and visual technology for group working

In comparison with other studies (Alltree & Thornton, 2004; Davies, Ramsey, Lindfield et al., 2005) access and availability of technology was not mentioned at interview by many students in this study, although access had been identified as an influencing factor in questionnaire 1. That access didn't seem to be a major issue may reflect the organization of groups, putting students who wanted to use a technology together, and the increasing availability of technology (Garrison & Vaughan, 2008). A few students commented that they would only use a technology that all of the students had access to and were familiar with. This has been found by other practitioners; *"the lowest common denominator determines the choice"* p13 (Kirschner, Martens, & Strijbos, 2004). If universities want students to use a particular technology, then this factor may need to be addressed for those students without personal IT. My recommendation is to:

3. Explore the extent to which access and availability of technology is impacting individual students' ability to participate in group working

Students did not want to use their open source and social networking sites for educational collaborative activities; they wanted to keep them separate from their educational technologies. This may relate to their professional identity. This is supported by a recent conference presentation pointedly entitled, "Get your face out of MySpace" (Jones & Jones, 2009). Whilst some academics are using social networking sites I am unaware of any use by health faculties except for marketing and admissions. My recommendation is:

4. To use University provided IT systems such as StudyNet and associated educational technologies rather than social networking sites, to support student learning

5.1.3 Classroom technology

The classroom technologies were highly valued by all of the students. The data projector and computer in LG3 and the LRC group rooms were identified as meeting their needs for transparency (all students could see the group output), democracy (they could all participate equally) and connectivity between virtual and physical environments (they could link online to their group site on StudyNet). Students wanted to use this classroom technology more frequently but due to resource availability they couldn't always achieve this. On these occasions students often had to crowd around a row of computers, impacting on participation. Classroom technologies were highly valued yet the majority of classrooms at UH remain set in traditional instructional design layouts with no collaborative technology (see Figure 24 and Figure 25).

Figure 24 LG3 with collaborative technology

Figure 25 Normal classroom in the Wright building

The whole of the third year of the physiotherapy programme is taught using collaborative learning, as is the third year inter-professional module that all undergraduates study. Given the findings of this study, there is a strong argument for developing improved physical and technological collaborative learning spaces to ensure congruence between pedagogy and classrooms. This will need negotiation between many different departments - Estates, Learning Information Services (LIS), the Learning and Teaching Institute (LTI) and the Faculty Learning and Teaching Group (FLTAG). If we are to support our students in collaborative learning then classrooms need to be fit for purpose. The design and technology of most current classrooms supports the individual and acquisition metaphor and deters collaboration.

Given that most of these students have laptops, there is a need to provide some sort of visual display and collaborative furniture to enhance collaboration. I have already initiated this dialogue and made presentations at the faculty teaching and learning group.

I have been in contact with the director of teaching and learning and we are jointly pursing some options (see Appendix 19). My recommendations are:

5. To expand the provision of collaborative classroom technology and socially orientated layouts of classrooms through working with the institutional groups LTI, LTDU, FLTAG and estates.

5.1.4 Scaffolding of collaborative learning

The students recognised the importance of being able to work collaboratively although some worked more cooperatively for the majority of the task. Those students in group Task that worked cooperatively viewed other students as working with them to share out the work or to learn skills, rather than to collaborate to co-construct meaning. This may reflect their understanding of collaborative learning, their surface approach, or their ability to engage in collaborative discourse. This needs to be explored further.

In a study on CSCL by Lizzio and Wilson (2008) students who didn't participate in team building were focused on getting the task done and minimizing effort. They suggest that students who didn't participate in team building activities were *"risk adverse"* with a *"weaker sense of academic efficacy"* (Lizzio & Wilson, 2008). The group Task, that worked more cooperatively, didn't describe a storming process. This suggests that individual students didn't have agency in the group to participate in socio-conflict. This was also reflected in the clear roles they allocated each other. Such roles minimized the need for discussion and higher levels of cognition associated with "deep" learning (Biggs, 2003; Marton & Säljö, 1976). Collaborative learning can enhance self esteem and enable

students with poorer patterns of working to learn more effective strategies (Roberts, 2005). But, for this to occur, there needs to be sufficient scaffolding to facilitate participation, diversity in the group to include students with 'good' patterns of working and a process to support group dynamics.

The team building activities required of the students (e.g. the ground rules contract) were all focused on the classroom setting and so may have promoted the face-to-face environment. Tutors need to set clear expectations and enter a dialogue with students about collaborative learning. In my own work I have already started this process using quotes from this study as triggers with the current cohort of students. This was interesting as one of the students, in the opening session, expressed that group work was 'hard work' and so they didn't really want to do it. In discussion I suggested this was because they were having their views challenged and by being called upon to justify them, it would deepen their understanding. The following week, I heard one group congratulating themselves that they were arguing a lot and recognising this as positive for their learning. Other means of setting expectations such as podcasts of students from past cohorts, followed by tutorials or online discussion, might enable students to engage more effectively. I am currently working with four other lecturers on a bid for a grant to create a student produced interactive learning resource to support collaborative learning. My recommendation is to:

6. Further develop "scaffolding" for collaborative learning to enable students to have a participatory understanding and to develop their abilities to engage in "interaction" and socio-conflict in collaborative learning, especially online.

Unlike previous studies where some students have said that they hated technology (Alltree & Thornton, 2004) or didn't see it as part of their professional practice (Hughes & Daykin, 2002), no students in this research study were completely negative about technology *per se*. Their concerns focused on the importance of social presence in effective communication. As the technological environment changes, whilst recognising the limitations of technologies, students may see them as part of practice in the future. This was also found in another recent study (King, Taylor, Satzinger et al., 2008).

The students in this study have used the MLE in a similar way to their lecturers, as a resource or for giving of information rather than as a communication medium. If we consider the importance of the situated perspective to learning as relevant to practice (Beetham & Sharpe, 2007) and the theories of learning proposed by Wenger (1998; Wenger, McDermott, & Snyder, 2002), the students, as peripheral participants, will see their tutors and clinicians as role models of the community of practice. If we are to encourage students to participate in online communication then we need to demonstrate this activity as part of our practice or the students will inevitably see this as unimportant. Now that some clinicians are gaining access to StudyNet, creating a tutor / clinician discussion should be more feasible. My recommendations are:

7. Promote with students, through dialogue, the role of technologies in supporting professional practice and provide role model examples of collaboration online by lecturers and where possible with clinicians, so that students see this as part of their professional identity.

8. Continue to explore how collaborative learning can enhance the students' experience and develop them for their professional role.

5.1.5 Professional implications

There have been increasing effort to develop e-learning and technology use in health education, for example the Interactive CSP (ICSP) and recently the NHS East of England has launched an e-learning strategy. However these have both focussed on asynchronous text based technological applications. Given the results of my study, specifically students largely rejected asynchronous text based communication for collaboration, it is worth examining these.

The society of physiotherapy launched ICSP in 2007, with the intention as stated on the front web page of physiotherapists engaging in sharing knowledge and interacting.

> *"Interactive CSP enables clinical peers to keep up to date, to interact and to share knowledge." (ICSP accessed 20th March 2009)*

However the findings of this study and recent research raise questions such as whether asynchronous text discussion sites will be used for anything more than sharing of information. Kirschner et al, (2004) suggest that we need to evaluate the natural mapping of technology use. On analysing the ISCP site there is little evidence to suggest that they are providing the interaction intended. They are being largely used for sharing resources rather than knowledge. For example, at the neurology speciality network on ICSP in March 2009 there were only 23 threads and most threads were simple requests. There was minimal discussion, only one active thread, in two and a half years of development.

The East of England e-learning strategy was launched in March 2009, the report of the pilot in the North Essex region makes interesting reading. Of the 45 participants enrolled who were *"interested"*, only four completed all four modules. The highest uptake was by the community staff, with only four ward staff taking part. The candidates engaged most when *"supported in person by a facilitator"* and the authors conclude that: *"e-learning is not a panacea but could be used with other methods," (Accessed 20th March 2009).*

Given the results of my study, other research (see 2.3.6, page 37) and the analysis above, there appears to be a tension between our professional culture and asynchronous text based discussion. Perhaps we need to start to refine our use of asynchronous text based discussion threads, limiting it to situations where students are off site or for clinicians in the community. We may also need to accept that considerable training, experience and facilitation in the use of these technologies may be required. Perhaps there is a need to accept that as a profession our means of communication is largely oral and we should pursue technologies that are voice based such as podcasts, or consider using synchronous and high social presence technologies such as Webinars (virtual seminars). It is necessary for the use of technology for learning to move from a few *"committed enthusiasts"* (Moule, Ward, Lockyer, & Shepherd, 2009) to mainstream practice, but this must reflect our professional values. I note for example that most of my students have listened to podcasts of clinicians that I put on a module site. This needs to be explored further. My recommendation is to:

9. Explore with the wider profession how knowledge can be developed within the profession online.

Chapter 6. Conclusion

In this chapter I will summarise my key findings, the implications for practice and the originality of this study.

6.1 Summary of Key findings

Despite organising students into groups based on their choice of blend the students actually all used a similar blend: face-to-face meetings for discussion, file sharer on StudyNet as a repository, discussion sites and texts on mobile phones for administration activities such as confirming meeting times. What differed in the groups was the extent to which they met face-to-face and did the task collaboratively compared to sub-dividing the task and working more cooperatively.

Whilst open to the use of new technologies, the students didn't use the range of technologies they thought they would. Instead they tended to use what they knew from past experience (that is StudyNet). In particular, the students didn't use the asynchronous discussion sites for co-construction of knowledge, preferring to do this face-to-face. This was because the discussion sites didn't provide the social presence and the synchronous affordance the students needed for co-construction and which was provided in the face-to-face environment. They were able to maximise the efficiency of the process through using technology both online and in the classroom, linking the face-to-face and group site through using networked computers in the classroom. They used technologies that supported inclusivity. For example, by using the data projector in LG3 and LRC group rooms and the files sharer on StudyNet so that all of the group could see the output. The

students wanted all members of the group to be involved in any decision making, and they wanted to keep their educational technology (StudyNet) and social networking sites separate.

All groups followed a similar process:

Stage 1 Preparation

Stage 2 Defining, Brainstorming, and sharing out of the work

Stage 3 Searching and gathering information

Stage 4 Answering the question

Stage 5 Practicing the presentation

Stage 6 Presenting and reflecting

Through these stages the students moved from individual to cooperative to collaborative working. For some groups this was a linear process but for others it was more iterative.

There were differences between the groups. The groups that had expressed a choice for more face-to-face, took a deep approach to the topic, meeting frequently, collaborating extensively and focussed on co-construction of knowledge. The group members expressed pride in their performance and the learning they had achieved. Students who had expressed a preference to use more technologies didn't use them in practice. Instead they tended to take a surface task approach and worked more cooperatively, having clear roles and dividing up the task. They focussed on efficiency of task completion but recognised that their work was not of the highest standard.

Despite this, all the students in the study valued working with their peers, recognising the importance of being able to collaborate as an important attribute of a professional physiotherapist. All students felt that their learning had been enhanced by the collaboration with peers and some students expressed this as personal development in their identity.

6.2 Recommendations for Practice

To summarise, the following recommendations can further enhance the students' collaborative learning experience:

1. Review collaborative learning across the programme to create an overall progression and to create opportunities for students to experience different communication technologies for collaboration.
2. Explore the use of Elluminate or similar synchronous voice and visual technology for group working.
3. Explore the extent to which access and availability of technology is impacting individual student's ability to participate in group working.
4. To use University provided IT systems such as StudyNet and associated educational technologies rather than social networking sites, to support student learning.
5. To expand the provision of collaborative classroom technology and socially orientated layouts of classrooms through working with the institutional groups LTI, LTDU, FLTAG and estates.

6. Further develop "scaffolding" for collaborative learning to enable students to have a participatory understanding and to develop their abilities to engage in "interaction" and socio-conflict in collaborative learning, especially online.
7. Promote with students, through dialogue, the role of technologies in supporting professional practice and provide role model examples of collaboration online by lecturers and where possible with clinicians, so that students see this as part of their professional identity.
8. Continue to explore how collaborative learning can enhance the students' experience and develop them for their professional role.
9. Explore with the wider profession how knowledge can be developed within the profession online.

6.3 Further work

As with most studies, this study has thrown up more questions than it has answered. There is a need to further explore the relationship of technology and the culture within the health discipline; in particular in the use of asynchronous text based discussions, as there appears to be a tension here. Within this, there is a need to explore if, with training and development work, students can work effectively through such a medium to collaborate and co-construct meaning. This is essential if ICSP and other postgraduate learning opportunities are to be taken up by our graduates for knowledge construction rather than information sharing. A further aspect of this is to explore whether synchronous technologies provide a greater and more acceptable affordance for collaborative working in the health discipline in some contexts.

Given the current classroom provision and the findings of this study, there is a need for further research into classroom design and its relationship with collaboration. There is also a need to look at pragmatic ways in which classrooms can be adapted to be fit for purpose. The use of the keyboard and mouse in LG3 and the relationship of control of the computer and control within the group also warrant further investigation.

The way in which students learn to develop as collaborative learners in the undergraduate programme, and to what extent our scaffolding is generating a designated identity (Sfard & Prusak, 2005), also needs to be explored. Why do some students take a more surface and cooperative approach? This could lead us to identify how students develop an understanding of collaborative learning, the impact of this on their use of technology and how it influences their engagement in dialogue and socio-conflict required in knowledge construction.

Finally perhaps as a profession we need to reflect and investigate which of our values we may need to adapt to take advantage of the changing technological climate. It would be interesting to research how these values are changing to embrace the rapidly changing technological environment.

6.4 Original Contribution

This is an in-depth study of one cohort's experiences of choosing and using technology for undertaking weekly collaborative presentations and as such it is unique. By exploring the whole student experience, including technology in the classroom, use of the MLE and the

use of open source technologies I have been able to gain insights into the students' choice and use of technology for collaborative learning when on-campus.

The findings have shown that each student's choice is complex and multi-factorial. The implications of these findings, when combined with the rapidly growing body of literature and with changing technologies, show the need for us constantly to explore our practice. To try to understand the students' perspective so that we can provide technologies and scaffolding that can enhance learning.

As a result of this study, I have developed my knowledge of education, technology and the means of investigation. This should enable me to undertake my work roles more effectively, in particular in enhancing collaborative learning at UH. I have also been able to participate in knowledge construction with peers through conference presentations (14) and publications (3), as well as workshops. These are listed in Appendix 20 and a copy of a paper is provided in Appendix 21. These dissemination activities have included international and national conferences in higher education and the health profession. I was awarded the 'Best' workshop at Faculty Teaching and Learning Conference in 2007, as voted by conference participants using electronic voting systems. Through this dissemination activity I have developed further my thinking and contributed to the wider community.

6.5 Summary of the concluding chapter

The findings from this study suggest that students who prefer to work in face-to-face activities take a collaborative approach to their learning, relying on group members to

help them with their interpretation of material and as a result adopt a deep approach to learning. Those students who identified a preference for a more technological approach to learning also valued face-to-face activities but tended to see this as a means of allocating and sharing workload, rather than sharing interpretation and understanding of their task. These findings have implications for the structure and process of educational practice, in particular:

- the organisation of the physical classroom and technology provided within the classroom
- the provision of synchronous IT and voice communication to enable group work whilst students are off campus.
- curriculum development to include requirements for IT based activities and group work
- pedagogy that facilitates effective group work

Conference presentations and publications arising from this study demonstrate that the findings are of interest to a wide audience of academics as well as professional practitioners.

Chapter 7. Reflections on undertaking this study

7.1 Introduction

Throughout this thesis I have aimed to provide a reflexive account of my study. In this chapter I will provide:

- A critique of the study
- Personal Reflections.

7.2 Critique of the study

This section will further critically evaluate the inquiry, the trustworthiness and rigour of this research study. I have written the methodology chapter in a reflexive style so that the reader can follow the issues that arose during the investigation, so this section describes some of the overarching issues.

Firstly the study itself might have benefitted from a more specific focus, rather than combining three topics (choice, collaborative learning, blended Learning) although the advantage of a more naturalistic, open and exploring approach is what gives this study its originality. Unlike many other studies it didn't just look at online use or one technology. It was difficult to use the literature to create a focus because the majority of the literature on health students in the literature review was not published in 2006 when the study started. The conflict between professional physiotherapy values and identity and the use of technology could have been pursued more at interview and needs further work.

I was in a sense an insider, as a BLU teacher and tutor, so there would have been some reactivity to what the participants perceived my view to be. However, considering the outcomes this enhances the finding that the students rejected online technology, (although it could have impacted on their 'story' regarding collaboration). Given that students are 'told' they must collaborate (i.e. given a designated identity (Sfard & Prusak, 2005)) to become physiotherapists it is unlikely that they would reject this (although one student in the pilot did). I was also acutely aware of my power over the participants and so, perhaps, didn't pursue topics as thoroughly as I could have done because of my concerns over causing stress to the participant. An outsider might not have experienced this constraint.

Because I was new to qualitative data collection methods I was learning in-practice. This is evident in the construction of the questionnaires, the quality of the interviews and targeting of data collection methods, all of which I now realise could have been improved given my current knowledge. Although I adopted a mixed methodology my qualitative data was, by its nature, the richest and most useful. I learn by 'doing' and so while reading, discussing topics with colleagues and reflecting influences my practice, it is through experience that I have most effectively developed my research knowledge and understanding.

The sampling I used was aimed at collecting as much data as possible and was low risk in that I would collect some data. This choice was influenced by the context of this study being for an award which meant I needed some data. It may be that choosing to follow

fewer students or groups and carry out a more in depth analysis would have given a richer story. However, this approach would have been high risk, because if students dropped out, I may not have had a study at all. Also, by getting a more holistic picture, I can now focus future research on specific issues.

If I was to undertake a similar study again I would ideally undertake a more iterative study where I could collect data, analyse and discuss with participants the findings. This would however require more dedicated time to enable the analysis to be undertaken rapidly, but could be achieved if fewer students were studied, and online survey methods used. Also as a result of the growing body of literature I would explore more the relationship of health practice and the use of technology, in particular to what extent students perceive technology use as relevant to health practice. Finally, I would change some aspects of the methodology; students are now much more familiar with online surveys due to the National Students' Survey and other evaluative studies, so using an online survey instead of questionnaires would be feasible. It would reduce the time taken for data entry and allow more rapid analysis potentially allowing a more iterative process. If possible having the interviews carried out by someone other than the tutor would strengthen the credibility of the findings.

7.2.1 Trustworthiness and rigour

A key aspect of research is its ability to inform practice and for this it needs to be trustworthy. It is upon this issue that there is considerable debate in the literature (Bassey, 1999; Denzin & Lincoln, 1998; Rolfe, 2006). Within the positivist theoretical perspective, there is an attempt to try to reduce "bias" and improve 'reliability and

validity' in an attempt to increase the 'value' of the research. The "gold standard" is to have no bias. This contrasts with the post modernist perspective where *"no particular discourse has a privileged position"* (Rolfe, 2001). There is a growing recognition of other theoretical perspectives and that interpretive and mixed methodologies can still result in rigorous quality research (Stake, 2006). The issue that causes much consternation using mixed methods in an interpretivist methodology is the notion of validity (Stake, 2006). In this context validity means the extent to which data or findings:

"represent what they purport to represent" p.123 (Sim & Wright, 2000).

Within an interpretivist theoretical perspective, credibility is seen as the extent to which the interpretation has resulted from rigorous and transparent methods (Robson, 1993; Thorne, Kirkham, & O'Flynn-Magee, 2004), and to what extent it is 'trustworthy' or authentic as opposed to any validity in the method itself (Lincoln & Guba, 2000). In social research generalisations cannot be context free (Robson, 1993). Recognising this I have provided detail of the context of this study. In the methodology I have provided a detailed account of how data was collected and analysed, and openly declared where the realities of practice impacted on my data collection (for example in recruitment for questionnaire 2). In addition, I have discussed my findings to assert their face validity with my colleague (who tutors on this course) in what Bassey (1999) describes as an auditing role. In this I have accepted that a critical friend, someone who will read and comment on the presentation of findings (Bassey, 1999) is an important asset to my study, my supervisor could also be seen in this role.

Researchers using qualitative methodologies who seek to increase the clarity of their communications often use multiple perspectives (triangulation) to increase the trustworthiness of their research (Stake, 2000). Researcher reflexivity and transparent processes (Robson, 1993; Schofield, 1993) also contribute to clarity. This study used multiple data sources and a mixed methodology to achieve a rich understanding. For example, through observing and analysing data on what the students actually did and asking them what they thought, the use of multiple methods generated an in-depth understanding (Denzin & Lincoln, 1998). By using a number of different data collection tools, and both quantitative and qualitative methodologies, I have been able to triangulate my data. This has enabled rival interpretations to be considered and rejected (see 3.6.2).

There is an array of different terminologies used to apply the notion of generalisability in the interpretive perspective, including 'fittingness' (Denzin & Lincoln, 1998), credibility (Robson, 1993), dependability (Robson, 1993), plausibility (Bassey, 1999), fuzzy propositions (Bassey, 1999) and tentative assertions (Stake, 2006) - all of which are, naturally, open to interpretation. The emphasis here is on the practitioner or reader making the comparability or judgement (Bassey, 1999) between the case and their own understanding. It is the role of the researcher to provide substantive detail to enable that process (Stake, 2000). The emphasis is not on the researcher being external to the area studied in order to be 'objective' but for them to be immersed within it, such that they know the context and have a rich understanding. It is this that gives the research credibility (Robson, 1993) when presenting findings. I was in some senses an insider and

others an outsider as discussed in sections 3.4.2 and Appendix 1. In the interpretivist perspective it is for the reader to interpret the relevance of my findings to their own practice (transferability).

By trying to undertake social research that was meaningful (Schofield, 1993) I have studied a group of students studying on an existing programme without modifying their actual curriculum. These participants' experience was therefore typical of all the students' on the programme and of many of the students within the faculty and the university generally. This study may be relevant to other programmes as more universities utilise blended learning activities in their programmes (Sharpe, Benfield, Lessner et al., 2005). The understanding created by this case study will help inform that development.

Throughout this thesis I endeavoured to make both the process and the findings transparent to enable effective interpretation by the reader.

7.3 Personal reflections

This study arose from my reflective practice and also reflects my personal values. Reflexivity is essential in research within the interpretivist perspective (Lincoln & Guba, 2000; Robson, 1993). In this section I reflect on my relationship to the topics and my experience of undertaking this study.

I am a woman, 45 years old, and throughout my life, I have placed a high value on choice and education. My mother works as a teacher. I went to a comprehensive school where I made some difficult choices. For example, in a Chemistry class, only two of us were

studying to GCSE standard. We were given the textbook while the teacher taught the rest of the class. I chose to study, and I was the only one who passed GCSE Chemistry. I got married at 18 and yet continue with my studies and career. When studying for my MBA, the importance of empowerment was reinforced. The importance of choice links directly with my view of collaborative learning because this can, in part, address the power relationship of teacher and student by giving the teacher a more facilitative role.

Women are known to be more socially orientated and as such I enjoy collaboration. Writing this thesis as an individual has been very challenging for me. I qualified as a physiotherapist and specialised in neurological rehabilitation where collaboration is a necessity for patient care. I become a manager of six different health professionals, all of whom had different working practices and values. I had to facilitate collaboration over patient care. This developed my understanding of the complexity of collaboration.

I have been surrounded by technology at home, partly due to marrying an electronic engineer and partly due to having two teenage children. This has meant electronic gadgets are never far away and we have more computers in the house than people. I am, however, considered 'non-techy' by my family. My interest in how technology can enhance learning started when I was studying knowledge management with the OU. In those days the technology was very limited, but I could see potential for adding flexibility and for creating opportunities for learning without face-to-face contact. On joining UH I was one of the early adopters of the MLE and this led me to becoming a blended learning teacher, where my role is to encourage the effective use of technology. The key word

here is effective; we are still in the early days of understanding what the technology can offer and, in addition, the technology itself is constantly changing. So, I am an enthusiast for enhancing learning and value collaboration and view technology as a way of achieving this.

Undertaking this study has been a challenging personal journey involving the inevitable juggling of many life roles, as well as changes at work and illness. In the first year I struggled with the challenge of moving from my positivist paradigm and to understanding qualitative data collection strategies. I also found it difficult to focus the study and needed numerous iterations of the research questions. It was a frustrating year with heavy work commitments and then illness, the latter resulting in my ending the year in hospital having major surgery. The second year started with the difficulty of changing my supervisor. This change of supervisor and a period of recovery from my illness, gave me time for reflection which, although stressful at the time, aided my development and understanding.

The outcome of this reflection was a change in the direction of the research, in particular the analysis, which took a more qualitative and interpretivist direction. I realise now that I had not achieved a deep understanding in the first year and this had impeded my progress. Finally, during the writing-up phase, there have been major reorganisations at work with colleagues being made redundant and ever-increasing workloads. I entered a competitive process to apply for another year's secondment in BLU and applied for a role

in the Health and Emergency Professions School. Inevitably this has impacted on the time available for this study.

The rapidly changing technological context also caused tensions in this project. In some contexts I felt technologically advanced. For example, at the OU EdD first year residential, the interview session included tape recording interviews and using highlighters for undertaking paper based data analysis, whereas I was intending to use an MP3 recorder and the software package NVivo for analysis. However as wikis became more main stream and mobile learning developed, I also at times felt my study was becoming less relevant. This rapid change of practice has meant that I have needed to present and publish as the work progressed, to ensure its relevance and to contribute to practice developments. This can be difficult with research studies of this duration, especially with the time required for data to be analysed and reported. This dissemination and engagement in conferences and forums also takes time and commitment but is essential if the research is to contribute to practice.

So to conclude, I have changed in myself, both in my knowledge and understanding of the research process but also in how I now see the world and my practice. In many ways this has been a very liberating personal experience.

7.4 Summary of reflections chapter

In this final chapter I reflect and critique this study. I also reflect on how both the study and I have changed and developed. I have already started to disseminate this study and begun related work engaging in a dialogue to enhance future practice.

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Appendices

Appendix 1. Insider /outsider relationship

	Insider	Outsider
Location		
UH	At UH since 2001 very loyal to the university and departments	Most of my working life in the NHS, but this is a public sector organisation and so could be seen as insider in the wider context of society
Blended Learning Unit	I am a teacher in the BLU and therefore committed to blended learning	Not a "digital native"! Come from my discipline (physiotherapy) into education
Participants: students		
Gender	Most students are female	A few male students
Ethnicity	Most students Caucasian	A few students from ethnic minorities
Mature or direct entrant	The majority of students are direct entrant with 30-40% of the cohort mature students	I am older than the majority of students
Status	Students are undergraduates but I am a student too as a postgraduate	Lecturer and Teaching Fellow, I am the tutor
Social group	No specific information on this but most students traditionally are middle Class Some mature students have families	There is a strong widening participation agenda although this hasn't had much impact to date

Method		
Case study design	I have carried out two case studies, both using mixed methodology, but previous to this 20 years as a positivist - very much a new area	Consciously I have moved from a health science positivist stance but I still struggle with my previous training and values
Topic areas		
Student choice	For the last 10 years I have been committed to the empowerment model and giving students choice	Pressures as a lecturer for module success may make it difficult not to direct students
Blended environment	Using this for four years as a lecturer and using e-learning for many years having studied with the OU Previous Lead of Computer supported Collaborative learning group	I enjoy collaborating in any medium or face-to-face
Collaborative learning	Very committed to collaborative learning Long history of studying and using group work in teaching	I will not be in the case groups

Appendix 2. Interview process

Students were welcomed and shown into the BLU room. Initially I would have a brief chat to ask them how they were getting on or discuss something that had happened that week to relax them.

I explained that I was going to tell them about the interview process and the project and then they could either leave or if they wished to continue I would give them the consent form and continue.

I went through the consent, confidentiality, that I was not undertaking any assessment not under anonymity number, and that they could withdraw at any time. Also that the interview was recorded using a digital recorder, and how the data was stored.

I then asked them if they were happy to do the interview. They then completed the consent form which acted as a trigger for any further questions they had.

Three cards and a diagram were placed in front of the student, I asked them to start by talking through a week in AP indicating towards the diagram.

Having asked questions to clarify or expand on what they had said I then orientated them through the cards and then finally asked if they had anything they wished to add.

Appendix 3. Questionnaire 1

Undergraduate Health Students' choice of blend for collaborative learning

This should take you less than 10 minutes to complete.

Your Name:

1. When you filled in the group preference sheet to what extent did you feel you had a choice?

Choice	Please circle					
I have a choice as to the blend I use	**1**	**2**	**3**	**4**	**5**	**My choice is very restricted**

2. Did any of these factors influence your choice?

	YES this did influence my choice	**Please circle**	**NO this did not influence my choice**
Your personal preference for the way you like to learn		**1 2 3 4 5**	
The availability of technology for you to use		**1 2 3 4 5**	
Other commitments that make it hard for you to be on campus to meet face to face		**1 2 3 4 5**	
The time of day / night that you like to study		**1 2 3 4 5**	
Your previous experience of collaborative learning		**1 2 3 4 5**	
Your confidence with using the technology		**1 2 3 4 5**	

Are there any other factors that influenced your preference?

Which was the most important factor in determining your choice?

What are your expectations of working in a group on a task?

Do you have any other comments about your choice of blend, and / or collaborative learning?

Thank you for completing this questionnaire.

Appendix 4. Questionnaire 2

This relates to your team's work to prepare for the **Advancing Practice** seminar, and is focused on the blend (use of Technologies and Face-to-face meetings) that you used. This should take you less than 10 minutes to complete.

Your Name:

The blend your group used

1. **During this week how many face-to-face meetings have you had separate to the tutorials?**

1 2 3 4 5 6 7 8 more

2. **What technologies have you used?**

Technology	**Please tick** all that you have used	**What for?** Please comment
StudyNet group site		
MSN		
Skype		
Face book		
Mobile phones		
Other please specify...		

Reflecting on the blend you have used this week for the AP seminar task:

3. **Would you want to change the blend you have used this week for subsequent weeks?** Please circle

Yes / No

If so how?

Your Choice of Blend

4. **In the ground rules tutorial, you decided on the blend to use for undertaking your weekly group task. To what extent did you feel you had a choice?**

Please circle

Complete Choice 1 2 3 4 5 Very restricted

5. **To what extent is the choice of blend made by the group similar or different to your own personal choice?**

The choice of blend by the group is:

Please circle

Exactly want I would have wanted 1 2 3 4 5 Substantially different to what I wanted

If you have circled 1 go to Q7

6. **I would you have chosen:**

	Tick all that apply
To have more face to face meetings	
To have less face to face meetings	
To work more online using technology	
To work less online	

7. **What factors impacted on your choice?**

Do you have any other comments about your choice of blend, and / or collaborative learning?

Thank you for completing this questionnaire.

Appendix 5. Questionnaire 3

This relates to your team's work to prepare for the **Advancing Practice** seminar, and is focused on the blend (use of Technologies and Face-to-face meetings) that you used. This should take you less than 10 minutes to complete.

Your Name:

The Blend your group used

8. **During most weeks how many face-to-face meetings have you had separate to the tutorials?**

1 2 3 4 5 6 7 8 more

9. **What technologies have you used?**

Technology	**Please tick** all that you have used	**What for?** Please comment
Interactive white board in LG3		
Computer and Data projector in LG3		
Computer and data projector in Group rooms in LRC		
StudyNet group site		
MSN		
Skype		
Face book		
Mobile phones		
Other please specify...		

10. What factors influenced the blend you chose to use?

'Ideal' Blend

Thinking about the collaborative learning in AP.

11. If you could choose your ideal way to work to maximise your learning, how would you work with your team to complete the task?

Do you have any other comments about your choice of blend, and / or collaborative learning?

Thank you for completing this questionnaire.

Appendix 6. Information given to students at orientation

Email / StudyNet:

Second year students.

In the third year you will work in teams for both Advancing Practice and Applied Research. You will be in the same team for both of these modules which are worth a total of 60 credits (50%) of your degree classification. Therefore we want to try and put you in as functional teams as possible to give you the best chance of success. Research suggests that teams created not based on friendship groups are more effective. We have therefore used such data for the last 4 years to organise teams. In addition some of the research work I have been doing suggests that students like to use different blends (Use of technology or working face-to-face) to study, this year we would also like to accommodate that preference.

We have timetabled a session in week 31 in LG3 (Behind the coffee shop in the LRC) for you to see some of the technology that you can use for group working in AP and fill in questionnaires. We will then create teams that as far as possible take into account this data.

Therefore please:

- Come to the session in week 31 to express your preference
- If you miss your session please see Heather to complete the information or we will be unable to accommodate your preference.

I attach:

- The group preference questionnaire these will be given out in the session in LG3.
- Information about my research project.

I have also started a discussion thread if there are any questions that you would like to ask.

Undergraduate Health Students' choice of blend for collaborative learning

Information sheet

The researcher is Heather Thornton, supervisor Dr Peter Twining

Heather is a member of the blended learning unit and has a commitment to research blended learning as part of her role. She is undertaking this project for her studies with the Open University for a doctorate in Education.

The study is aimed at exploring the preferences of blend by undergraduate students when they are choosing how to work in groups to undertake a collaborative task. This study will be based on the collaborative tasks that you undertake for the module Advancing Practice, which you will study next year. The outcome of this study will be a deeper understanding from the students' perspective, including the reasoning behind preferences of working either face-to-face or using technology, which will then be able to inform and improve future practice.

You are invited to be part of this study. If you agree you can withdraw from any part or the whole of the study at any time without providing any explanation, and can ask that any or all of your data not to be used.

Although information may be collected under name, it will entered into the data base under participant number and remain confidential.

The researcher, Heather, will not mark any of the third year assessment, which is not marked by anonymity number, i.e. she will not mark the presentations that are part of the Advancing practice assessment.

Most data will be collected naturally i.e. requiring no additional activity from you other than that, which you would normally undertake. For example activity on the group site for StudyNet would be analysed and the feedback you are routinely given from your seminars would be documented. Additionally there will be brief questionnaires and some students will be asked to participate in short interviews.

Further information is available on StudyNet and if you have any questions please ask them on the StudyNet discussion thread, or see Heather.

Appendix 7. Group allocation sheet

Group sheet

This information will be used to place you into teams for your third year.

Your Name:

Please name two students who you would like to be in the same group as you:
Name:
Name:

Blend for group work

Circle your answer to the following questions

1. What blend would you most like to use for your group work?

Face-to-face	Please circle					**Online**
I don't want to use any technology	**1**	**2**	**3**	**4**	**5**	**I want to have minimal face-to-face meetings**

2. How many face-to-face meetings each week would you like to undertake the task?

1 2 3 4 5 6 more than 6

Technologies

4. I would like to use the following technologies in my group?

Group site on StudyNet:			
Discussion facility	**Yes**	**Maybe**	**No**
File sharing	**Yes**	**Maybe**	**No**
Wiki: Shared learning space	**Yes**	**Maybe**	**No**
Project planning	**Yes**	**Maybe**	**No**
Blog	**Yes**	**Maybe**	**No**
Other technologies:			
MSN	**Yes**	**Maybe**	**No**
Skype and related technology	**Yes**	**Maybe**	**No**
Mobile phone: Texting	**Yes**	**Maybe**	**No**

In tutorials:

Interactive white boards and data projectors	**Yes**	**Maybe**	**No**

Other please specify.....

5. I have my (please circle all that apply):

own laptop / own PC computer / no computer

Appendix 8. Ground rules contract

Team Name:

Names of team members:

Ground rules contract

1. What shall we call our team?

2. How are we going to storm effectively?

3. How are we going to share out the work? How will we undertake the work, face to face? Online?

Think through a week's preparation for a seminar and decide how you will do it.

4. Are we going to identify a leader every week or do we have one leader?

5. How do we give opportunities for individuals to work on both their strengths and weaknesses?

6. What will we do if we think someone is not contributing to the team to the best of their abilities?

7. How will we evaluate our performance?

8. When shall we have our first meeting?

Appendix 9. Observation sheet

Week Observation: Monday tutorial

Team: xxx

Are the group functioning as a team - All participating Quiet team Xxx operating the lap top and dominating discussion All joining in
What technology do they use and how? Used internet for searching – google and medline Xxx used interactive white board – they brainstormed and saved this to group site Started at the end of the session to use a PowerPoint file to structure presentation based on their brainstorm – saved this up to group site
Other comments Seemed to make considerable progress in the session and agreed next steps, however focussed on getting clear tasks for each individual. They had identified areas for individuals to go and explore further Note from seminar run out of time lots of information but limited synthesis

Appendix 10. Examples of monitoring function data

Here are some simple examples of the sort of data avilable through the monitoring function. Data can be shown by students, resources, time, access or log in.

Obviously I can also look on the group sites and see what the students have written and how they have used file manager, Wiki etc.

Access count by resource type for a week

I have removed student's names

Student Name	DMDs	Discussions	Groups	News	Teaching Resources	Total
student	0	11	0	7	15	33
student	0	17	0	10	32	59
student	0	11	0	6	10	27
student	0	10	0	6	15	31
student	0	14	0	11	17	42
student	0	4	0	9	9	22
student	0	10	0	11	26	47
student	0	5	0	8	11	24
student	0	15	0	12	21	48
student	0	7	0	2	11	20
student	0	23	1	10	16	50
student	0	1	0	7	16	24
student	0	5	0	10	14	29
student	0	7	0	9	17	33
student	0	0	0	10	23	33
student	0	9	0	8	18	35
student	0	7	0	5	14	26
student	0	1	0	9	15	25
student	0	2	0	1	7	10
student	0	15	0	11	14	40
student	0	1	0	5	10	16
student	0	9	0	9	19	37
student	0	18	0	8	23	49

student	0	15	0	9	19	43
student	0	16	0	10	19	45
student	0	5	0	7	17	29
student	0	23	0	11	25	59
student	1	2	0	7	9	19
student	0	17	0	10	13	40
student	0	11	0	3	17	31
student	0	14	0	11	23	48
student	0	0	0	1	0	1
student	0	3	0	12	17	32
student	0	24	0	10	22	56
student	0	1	0	11	14	26
student	0	10	0	11	16	37
student	0	13	0	11	14	38
student	0	19	0	10	31	60
Student	1	12	0	11	15	39
Student	0	8	0	9	19	36
Student	0	8	0	10	24	42
-Student	0	17	0	11	18	46
Student	0	20	0	10	23	53
Student	0	6	0	9	17	32
Student	0	11	0	11	17	39
Student	0	9	0	9	3	21
Student	0	17	0	10	11	38
Student	0	14	0	8	17	39
Student	0	6	0	7	8	21
Student	0	2	0	10	22	34
Student	0	5	0	8	21	34
Student	0	7	0	7	22	36
Student	0	20	0	9	22	51
Student	0	13	0	12	24	49
Student	0	12	0	11	26	49
Student	0	3	2	9	23	37
Student	0	7	0	10	10	27
Student	0	0	0	3	5	8

Student	0	13	0	10	55	78
Student	0	18	0	8	14	40
Student	0	1	0	4	7	12
Student	0	3	0	6	3	12
Student	0	2	0	9	16	27
Student	0	17	0	11	38	66
Student	0	9	0	0	9	18
Student	0	18	0	10	22	50
Student	0	3	0	11	11	25
Student	0	6	0	8	4	18
Student	0	5	0	7	13	25
Student	0	12	0	10	17	39
Student	0	2	0	10	10	22
Student	0	0	0	8	8	16
Student	0	1	0	9	27	37
Student	0	11	0	11	12	34
Student	0	5	0	6	18	29
Student	0	6	0	7	8	21
Student	0	17	0	10	22	49
Student	1	14	0	4	12	31
Student	0	12	0	5	12	29
Student	0	0	0	4	12	16
Student	0	13	0	8	17	38
Student	0	6	0	4	12	22
Student	0	9	0	10	17	36
Student	0	6	0	9	13	28
Student	0	7	0	10	23	40
Student	0	2	0	4	8	14
Student	0	0	0	3	18	21
	DMD	**Discussions**	**Groups**	**News**	**Teaching Resource**	**Total**
TOTALS	3	790	3	718	1434	2948

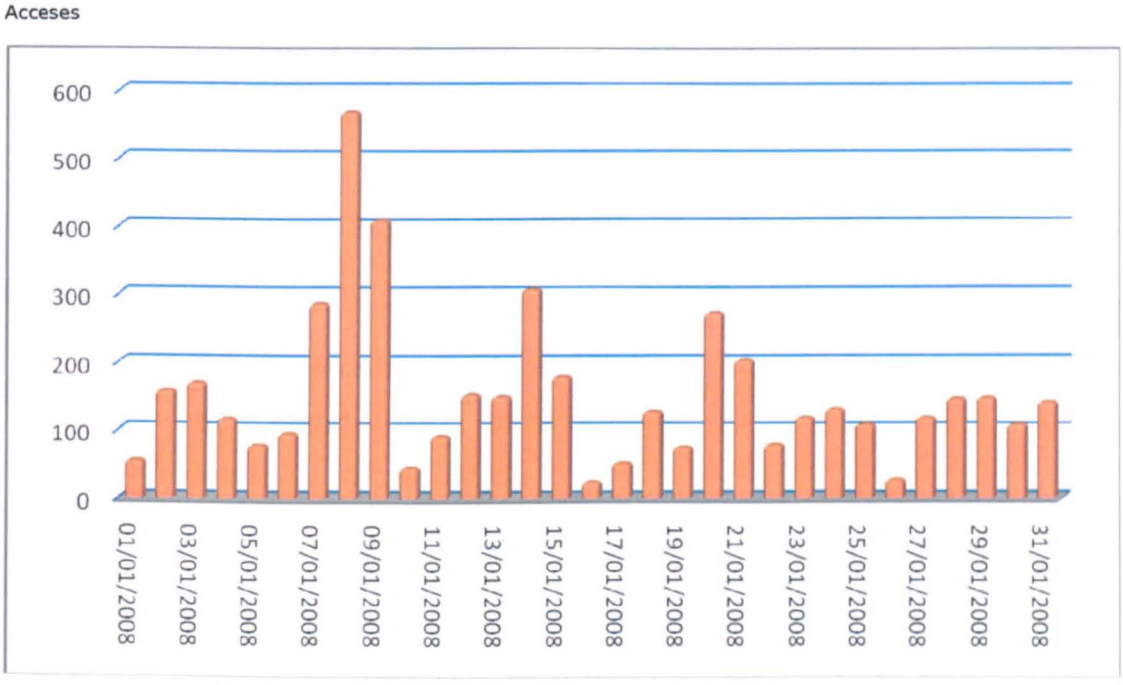
Below is the standard information given by the monitoring function.

Students highlighted in yellow have accessed the module less than half the average (mean = 34) number of times. These students may not be fully engaging with the course

and may benefit from personal discussion regarding their level of engagement. Students highlighted in grey have accessed the module more than twice the average (mean = 34) number of times. These students appear highly engaged with the course.

Students may have accessed resources of types not listed

Accesses of the AP site



Appendix 11. Ethical approval

The Open University

MEMORANDUM

HUMAN PARTICIPANTS AND MATERIALS ETHICS COMMITTEE

FROM:	John Oates, Chair, HPMEC	**Email:**	**j.m.oates@open.ac.uk**
To:	Heather Thornton (Principal investigator) Blended Learning Unit, University of Hertfordshire Peter Twining (Project supervisor) Open University	**TEL:**	52395
CC:		**DATE:**	3 November 2006
SUBJECT:	**Ethics application:** Students choice of blend for collaborative learning: A case study	**Ref:**	**HPMEC/06/#235/1**

This memorandum is to confirm that the research protocol for the above-named research project, as submitted on 24/10/2006, is approved by the Open University Human Participants and Materials Ethics Committee.

In due course, the Committee would like to receive an update on the progress of this project, any ethical issues that have arisen and how they have been dealt with.

John Oates

Chair, OU HPMEC

Appendix 12. Consent form for interviews

UNIVERSITY OF HERTFORDSHIRE

FACULTY OF HEALTH & HUMAN SCIENCES

PARAMEDIC SCIENCES, RADIOGRAPHY AND PHYSIOTHERAPY ETHICS COMMITTEE

CONSENT FORM FOR STUDIES INVOLVING HUMAN SUBJECTS

Students' choice of blend for collaborative learning: A case study

	YES	NO
The purpose of this study has been explained to me	☐	☐
I have been informed of the details of my involvement in the study	☐	☐
My questions regarding this study have been answered to my satisfaction	☐	☐
I understand that I am not obliged to take part in this study and may withdraw at any time without the need to justify my decision and without affecting me in any way	☐	☐
I understand that any personal information obtained as a result of my participation in this study will be treated as confidential and will not be made publicly available	☐	☐
	☐	☐

I, the undersigned, agree to take part in this study

Signature of subject:.....

Name of subject:.....

(Please print)

Signature of investigator:.....

Name of investigator:.....

(Please print)

Status of investigator:.....

Date:.....

Appendix 13. Data registration with the OU

Envelope-to: H.A.Thornton@herts.ac.uk

Subject: RE: Data protection registration

Date: Mon, 2 Apr 2007 12:06:37 +0100

X-MS-Has-Attach:

X-MS-TNEF-Correlator:

Thread-Topic: Data protection registration

Thread-Index: Acd0+mcyDSVaICOLLABORATIVE LEARNINGJQ+23zLmXWEMvsQAHIHEg

From: "H.N.Balhatchet" <H.N.Balhatchet@open.ac.uk>

To: "Heather Thornton" <H.A.Thornton@herts.ac.uk>

X-OriginalArrivalTime: 02 Apr 2007 11:06:38.0016 (UTC) FILETIME=[FBF42400:01C77516]

X-C-UH-MailScanner-Information: Please contact the administrator for more information

X-C-UH-MailScanner: No Virus detected

X-C-UH-MailScanner-From: h.n.balhatchet@open.ac.uk

X-M-UH-MailScanner-Information: UH-M-mail

X-UH-MailScanner: No Virus detected

Heather

That all sounds fine to me

I have forwarded your form on to the DP Office to register your project

Hugh

Appendix 14. Response to Student's Question

Information about why names are needed on Questionnaires

This was given out after poor response to Q2 resulting in greater recruitment.

Hi Third years

I took back to Heather your question about her questionnaires and her answer is below.

Undergraduate Health Students' choice of blend for collaborative learning

Response from Heather Thornton

I believe many of you were concerned about writing your name on the questionnaires and asked why this is required - a very good question.

To date most of your teaching on research has been in the positivist scientific paradigm, where anonymity and quantitative methodologies are valued and variables are controlled. However in education a different paradigm is often used called 'social constructivist', here we seek not to control variables but to try and look at real practice and research the complexity of what is happening. People are all unique and so to understand in depth what is happening, we need to link information to individuals to build a complex rich picture of what is going on. For those of you wishing to read more on this I will put my research stance on StudyNet.

This study is aimed at exploring the preferences of blend by yourselves when you are choosing how to work in groups to undertake a collaborative task. I am particularly interested in you as individuals i.e. the students' perspective, including the reasoning behind preferences of working either face-to-face or using technology, which will then be able to inform and improve future practice. So for example last year, in the pilot, I interviewed many of the third years at the end of the course (obviously I know who they

were as they were sitting in front of me) and then used data on StudyNet, academic results etc to build a picture of what was happening.

However I can reassure you that although your data is collected by name when it is entered onto my data base it is entered under participant number and remains confidential. In addition I will not mark any third year assessment that is not marked under anonymity number. If you agree to take part you can withdraw from any part or the whole of the study at any time without providing any explanation, and can ask that any or all of your data not to be used.

This study has ethical approval from the Open University ethics committee.

I hope this answers your question, please if you have any further questions do ask me, I will be happy to answer them. If you would now be willing to fill in the questionnaire (*named tutor*) has some for you.

Appendix 15. Methods of recruitment trialled in pilot

The methods of recruitment used in the pilot and the numbers recruited are shown below.

Week	Recruitment method	Number of students recruited	Total recruitment (cumulative)	Possible influencing factors
18	Paper copies of information sheet and consent handed out in a class and students asked to put completed consents in box outside office	1	1	Students recently returned from placement
19	Email by third year tutor	2	3	I didn't teach them in this week
20	Sheet with timed slots made available in sessions	7 + 2 emailed me to ask for a slot	12	First interview carried out Students were trying to recruit to their own studies and experiencing the difficulty of recruitment
21	Further slots made available as all previous slots filled	8 signed in slots 3 dropped-in	23	

In the end 23 students volunteered for the pilot of 95 in the cohort. It seems the more interviews I did the more then volunteered. Fifteen students were interviewed, 7 made appointments by email and the rest signed into slots, except for three that directly approached me. I was intending to interview them all but due to my hospitalisation this was not possible.

Appendix 16. Interview sheets for students to volunteer

Please sign in your name and take the slip. If there isn't a convenient slot then add your name and contact details to the final sheet. Don't sign in if your group is being taught. Thank you

Week 18 (this week)

Time slot (in brackets group being taught)	**Name**	**Take away slip**
Wednesday 23rd January 10 am (not group1)	name	Wednesday 23rd January 10 am Location: BLU (1st floor LRC) If you need to cancel or change please contact Heather by email or on ext 1318
Wednesday 23rd January 1 pm	name	Wednesday 23rd January 1 pm Location: BLU (1st floor LRC) If you need to cancel or change please contact Heather by email or on ext 1318
Thursday 24th January 10am (not group 2)	name	Thursday 24th January 10am Location: BLU (1st floor LRC) If you need to cancel or change please contact Heather by email or on ext 1318
Thursday 24th January 11.15am (not group 1)	name	Thursday 24th January 11.15am Location: BLU (1st floor LRC) If you need to cancel or change please contact Heather by email or on ext 1318
Thursday 24th January 1.15pm	name	Thursday 24th January 1.15pm Location: BLU (1st floor LRC) If you need to cancel or change please contact Heather by email or on ext 1318
Thursday 24th January 2.30pm	name	Thursday 24th January 2.30pm Location: BLU (1st floor LRC) If you need to cancel or change please contact Heather by email or on ext 1318

Appendix 17. Group sheet for data reduction

Example

Group : XXX this was another high collaborative group but not group Topic

This was a group with 3 yellow students and 2 green students

My notes on reading through transcripts and paper data

Black direct quotes

Weekly Process

Preparation

Arrived at tutorial having looked at question individually over WE

What question means and allocation of work

Lots of discussion over the meaning of the question active in tutorial

"from you know getting other peoples' opinions and inputs definitely helps you like for understanding certain things you can get their take on whatever you're trying to learn and hopefully understand it better".

we used the interactive white board we were quite happy to use the white boards in the classroom. That was really when we sort of got all of our ideas together

it was really nice using the whiteboard to should I say brainstorm our ideas which helped to glue everything together

Searching information

Searching out information during rest of the day on Monday and Tuesday.

Often met later on Monday and sometimes on Tuesday especially if someone found they didn't have much on their bit or found a new angle

Evaluating information and refining

Met for a long time on Wednesday got longer and longer i.e. emphasis on learning not on trying to get it done quickly

everyone in the group checked StudyNet every day quite frequently and everyone always carries their phone with them so they don't forget it at home.

If I'd have done it on my own the presentation probably wouldn't have been as thorough. There would have been areas which I would have skipped over personally so I think the whole group discussion actually worked quite well because you normally get four different ideas of what should be done so yeah I think meeting as a group doing it that way was good definitely.

Practising Delivery

Wednesday occasionally Thursday asked each other questions after run through to make sure they all understood as evidenced in seminar when they all participated in discussions following debate

eventually ran through it see if it ran through smoothly and logically and chopped and changed things round.

What they used and how

Studynet files sharer

A few posts mainly meeting times

put their slides on when they'd done them and we can then take them off StudyNet to compile them or on memory sticks that was really what we did. There was the occasional post on there to do with someone asking a question.

Face to face ++ choice that people did want to meet up.

I'm a more face to face type person. I like to see expressions, peoples' body language because over the internet, over the phone it's very expressionless you don't know if they're really annoyed with you or not so I'm very much a face to face type of person

meeting up is a better learning I can learn better that way and you know you can get feedback from everyone better than if you were doing this over MSN. You know you can't see peoples' gestures/facial expressions when you're on the phone whereas when you're meeting you can so...

Mobiles for meetings times and administrative information like meetings for example if a meeting had to be changed then everyone would phone around and change that or we...yeah we would send a text.

Other

everyone kind of changed their roles slightly throughout not a clear leader

we took turns of writing on the whiteboard so it was based on whoever wanted to do it

not Facebook or MSN

Yeah social's a better way of looking at it rather than professional or university related.

All expressed positive of collaboration –deep learning

like to work as part of a team or group because sometimes you might feel your ideas are about a bit like...are not right but then you express them and the group can like feed off your ideas and maybe change it a bit and then it can be a bit more effective. Erm, it's nice to feed off other peoples' ideas to enhance your own ideas as well and I just prefer interaction as opposed to working individual.

Summary

Collaborative group Used studynet but F2F for collaboration. Positive collaboration Liked IWB and LG3.

Appendix 18. Nodes from NVivo Analysis

Whole cohort - Interview codes, questionnaires

Red are Q1, Green Q2, Black are interview and Q3,

What was the students' experience of choosing and using a blend?

Themes	Codes from Nvivo	Supporting data
Use what you know works Personal preference based on past experience Use a familiar blend	own personal preference previous experience of group working mixed Blend best possible outcome- no risk confidence in technology personal preference need to get best results automatic put computer on felt comfortable working like this making the choice individual Studynet most useful resource using known ways of working	Excell data Q1, Q2, Q3 Analysis of activity of group sites
Use technology to maximise efficiency Time Use StudyNet as a repository to maximise use of face-to-face Use technology to link face-to-face to group sites	use when off site commitments prevent them getting into UH Save time Availability Time constraints and other commitments at Uh no need for online improving the process linking online and F2F putting information online putting information together speed of response time pressure using many computers to make more efficient best in time available	Monitoring on group sites Observation

Quality of interaction Co-construction requires face-to-face Use only when unable to meet face-to-face	Need face to face Face-to-face was best breaking into smaller groups getting a good F2Fenvironment to study in enjoying contact with people getting the right information by checking with others love or not technology need to meet F2F to collaborate sort things out Not like text	Discussion posts Observation
Inclusivity Use technologies that all of the group are using Use technologies that enhance equality and transparency Avoiding conflict in the group	fair sharing out of the workload people you get on with avoiding conflict in the group learn from each other group dynamics avoiding creating tension keeping everyone part of the group and informed valuing peers not use technology if someone didn't have it personalities impacting on the team roles and leadership trust working around individuals commitments controlling the computer trying technology out	Observation data
Technology is compartmentalised Technology for learning Technology for social life	Ease of use of StudyNet for learning Availability in technology work and social life as separate	Log in data

Was their any relationship between the student's choice, the blend used and the collaborative learning that took place?

Compared groups

Similarity	Difference
changing plan learning from feedback planning revising and changing content searching individual sharing out the work preparing or not for tutorial Comparing group sheets Observational data Comparing initial discussion of week in interviews Group site on StudyNet analysis	Cooperative or collaborative Comparing group sheets Observational data Comparing initial discussion of week in interviews Group site on StudyNet analysis Analysis of groups data - hard copy

Collaboration

changing and developing people

positive achievement

Analysis of individual's full data set

Appendix 19. Working with FLTAG on classroom technology

University of Hertfordshire

Faculty of Health & Human Sciences

Faculty Learning, Teaching & Assessment Group

Thursday 5 March 2009 from 13.00 to 15.00 hours in 1F254

Agenda

Welcome and Apologies

Minutes of the FLTAG meeting held on 14th October 2008 Paper 2

Matters Arising

306.08	SPMG data	(xx)
319.08	Inter-professional Education	(xx)
320.08	Dates of SN support sessions	(xx)
321.08	Numeracy support	(xx)
323.08	Plagiarism workshop	(xx)

4	BLU/StudyNet Activities	xxxxxxx
6.1	Review of Faculty targets	
6.2	Faculty good practice guidelines	
6.2	Audit of student development and training	
5	Interprofessional Education Update	xxxxxxx
6	Graduate Futures and Employability	Papers 6a, 6b, c xxxxxx
7	Student Support	
	7.1 Faculty Disability Co-ordinator report xxxxx	

8 Teaching and Learning

8.1 Faculty Teaching Accommodation Officer report xxxxxxx

8.2 Collaborative learning Paper 8a Heather Thornton

8.3 Work-based learning Paper 8b

8.4 Faculty Learning and Teaching Conference Paper 8c

8.5 Faculty Referencing Guidelines update

9 Assessment

9.1 Turnaround time Paper 9

10 Reports from Schools School Representatives

11 Emergency Business – please notify chair prior to the meeting

12 Date of next meeting: Tuesday 16th June 2009 13.00 – 15.00 hours in the Faculty Meeting Room 1F254

Paper presented

Collaborative learning

Prepared by Heather Thornton

Aim

This paper explores one recommendation from my doctoral studies entitled, "Undergraduate Health Students Choice of blend for collaborative learning", that if implemented could enhance the students experience of collaborative learning.

One recommendation that I would like to explore at this meeting of FLTAG is to:

- Work with the institutional groups LTI, LTDU, FLTAG etc to expand the provision of collaborative classroom technology and socially orientated layouts in classrooms

Background

The students in my study highly valued using LG3 in particular the ability of the group to see the group output. This strongly supported the group working in particular inclusivity,

democracy and collaborative mean making. Yet currently there is only one LG3. As many of the health programmes are based on collaborative learning there is a mismatch between the need for collaborative learning spaces and the standard Wright building classroom.

The standard classroom designed and organised for instructional teaching.

Options

So how can we resolve this?

Short term options:

Mobile option

Provide some mobile way of recreating the function of LG3. For example students could bring in their laptops and we could rearrange the tables and use hand held data

projectors. Given that most rooms have WiFi then this can in part recreate some function of LG3. We are currently purchasing a handheld data projector to test this idea out.

Fixed options

We organise some rooms with fixed either large computer screens or data projectors that enable group output to be seen. This would need further work to achieve.

Long term options:

New classrooms are developed to support collaborative learning. This has been undertaken in several universities of which I have visited. Certainly needs consideration in any new builds or refurbishment.

In the future I would welcome further discussion over other recommendations arising from my study that could improve collaborative learning in the faculty.

Appendix 20. Conference Presentations and Publications

I have already carried out some dissemination activities. The following presentations and publications have been based either partially or fully on scholarship and /or data that I have undertaken during my studies for the EdD. The work on podcasting was based on collaborative learning and drew on my knowledge from scholarly activity for this programme. The following are presented in reverse chronological order:

Presentations:

Thornton, H.A. (2009) How do undergraduate students use online and classroom technology to support their collaborative learning for seminar presentations? Chartered Society of Physiotherapy Congress, 16 and 17th October, Liverpool (Poster accepted)

Thornton, H.A. (2009) Surface and deep learning approaches taken by students to collaborative learning. Health and Human Science Conference, University of Hertfordshire, Hatfield, September 10th. (Abstract accepted)

Thornton, H.A. (2009) How do undergraduate physiotherapy students use technology for collaborative learning? School of Health and Emergency Professions Annual research Forum, 9th September, University of Hertfordshire, Hatfield. (Abstract accepted)

Thornton, H.A. (2009) Students' beliefs on collaborative learning impact on their choice and use of technology. The Future of the Student Learning Experience – HEA annual conference, University of Manchester, 30 June to 2 July

Thornton, H.A. (2009) "How students' chose their use of technology for collaborative learning? The 4th International Blended Learning Conference, University of Hertfordshire, Hatfield, 17th and 18th June, Available at https://sas.elluminate.com/site/external/jwsdetect/playback.jnlp?psid=2009-06-17.0548.M.EC359896D52AC90A6693A204A99E00.vcr.

Thornton H.A., Anders, A., Rickard, S. (2009) Collaborative learning using classroom and online technology – choosing and using technology to enhance learning, Festival of learning, HEA Health Science and Practice Subject Centre Conference, Walsall, March.

Anders, A. & **Thornton, H. A.** (2008) Using Podcasting to develop oral skills required for physiotherapy practice, The Third International Blended Learning Conference, University Of Hertfordshire, Hatfield.

Hilliard, A., **Thornton, H.A.** (2008) Using Technologies to enhance classroom interactivity, Plenary session, Faculty Teaching and Learning Conference, University of Hertfordshire, Hatfield.

Thornton, H. A. & Alltree, J. (2008) A Case Study of Technology supported collaborative learning. The Third Symposium on Social Learning Space: Redesigning Universities. Oxford Brookes University, Oxford.

Hilliard, A., **Thornton, H.A.** (2008) Using Technologies to enhance classroom interactivity. Festival of Learning, Carlisle, March.

Thornton, H. A. (2007) Blended Learning in the physiotherapy programmes at University of Hertfordshire. Physiotherapy Higher Education Providers conference, Chartered Society of Physiotherapy, London.

Thornton, H. A., Simmonds, J. & Wyer, S. (2007) Don't just podcast your lectures: Two different used of podcasts to support learning. Supporting the Net Generation Learner. University of Hertfordshire, Hatfield

Thornton, H.A. (2007) What blend do students choose for collaborative learning and why? Faculty Teaching and Learning Conference, University of Hertfordshire, Hatfield. (Appendix x)

Thornton, H.A. (2007) Do we really give students choice – enabling them to become self-directed learners? Faculty Teaching and Learning Conference, University of Hertfordshire, Hatfield.

Publications:

Thornton, H.A. (2009). How do students' choose and use technology for collaborative learning? *The 4th International Blended Learning Conference.* University of Hertfordshire, Hatfield: UH press.

Anders, A. & **Thornton, H. A.** (2009) Using podcasting to develop oral skills for physiotherapy practice. IN MINOCHA, S. (Ed.) A Study on the Effective Use of Social Software by Further and Higher Education in the UK to Support Student Learning and Engagement. JISC available at http://www.jisc.ac.uk/whatwedo/projects/socialsoftware08#downloads

Anders, A. & **Thornton, H. A.** (2008) Using Podcasting to develop oral skills required for physiotherapy professional practice. *The Third International Blended Learning Conference Proceedings,* University of Hertfordshire, Hatfield, University of Hertfordshire Press.

Awards:

'Best' workshop award 2007 (voted by conference participants using EVS) at Faculty Teaching and Learning Conference, University of Hertfordshire, Hatfield.

Appendix 21. Paper accepted for conference proceedings

Conference: The 4th International Blended Learning Conference. University of Hertfordshire, 2009.

How do students' choose and use technology for collaborative learning?

HEATHER A. THORNTON University of Hertfordshire

Abstract

In this case study, 86 physiotherapy undergraduate students studying a third year module, chose a blend for a collaborative task. Data was focused in capturing the students' experience, and included interviews, questionnaires, and observation of both face-to-face and online activity.

The students held strong views on collaborative learning that included inclusivity, valuing difference, democracy and the importance of all group members participating fully in decision making. All groups used a similar range of technology. They highly valued the classroom technologies provided in a specialised collaborative classroom that included computers and data projectors that enabled a group to visualise their output and connect to their online group sites. They used the online environment (the University's managed learning environment) largely as a repository, 'offloading' some of the organisational components of collaboration and for knowledge acquisition that enabled them to use the face-to-face meetings for interaction and co-construction of knowledge. They did not use the asynchronous facilities for discussion, more for basic information giving, in common with other studies

on undergraduate students. Students also wanted their education and social sites e.g. Facebook kept separate.

The process undertaken in completing the weekly tasks had clear stages which included individual and group components. The students' experience reflected aspects of both of the two major metaphors of learning 'acquisition' and 'participation'. Students organised their use of technology to enable them to maximise interaction when they met face-to-face. The implications for practice include, creating more dedicated high technology classrooms, introducing technologies in a structured way earlier in the course and tutors modelling their use.

Introduction

This paper will report on one aspect of a case study on a cohort of third year physiotherapy students undertaking weekly seminar presentations, focussing on the factors influencing student's choice of technology.

Background

When students are required to work collaboratively there needs to be some consensus within the group as to the means of communication for the students to work effectively. Through my reflective practice I noticed that in in some groups the use or not of technology appeared to impact on group working. The diversity of the cohort includes students who had grown up with the use of technology for learning and life in general, what are often described as 'Net generation learners' (Oblinger and Oblinger 2005) or 'Digital natives' (Prensky, 2001), and other students who had very limited prior experience of technology use – digital immigrants. However the preference was not simply related to generation.

One of the aims of blended learning is to increase flexibility and improve the students' experience. To enhance this choice, given the diversity in the cohort, I enabled students to express a preference for technology for communication in their second year and organised students into groups for their third year based on this expressed preference. This I reasoned would enable students to interact by whatever communication means they chose either face-to-face or online.

Finally we were having developed a specialised collaborative learning room and I wanted to see how this fitted into the overall student experience.

The Module

Advancing Practice (AP) is in the third year of the Physiotherapy honours degree. The students are divided into four classes; each class is divided into four small groups of 5-6 students.

The Task

Each group has a task alternating weekly between a debate motion and a case presentation. To support this students have a tutorial on the Monday with the tutor and then they prepare for the presentation on the Thursday. The debates use an electronic voting system that enables rapid anonymous voting (Thornton and Groefsema, 2006).

The Technology available

This study was undertaken in 2007/8. The students had used the institutional MLE, StudyNet for the previous two years. Before making their choice they had a workshop session demonstrating the technologies available in LG3 (a high technology classroom), and open source applications. Technology available

changed dramatically during the study, at the beginning only a few students were on Facebook but by the end all of the students interviewed were on Facebook.

StudyNet has private group sites including discussion facilities, blogs, file sharer, project planner, tagging and wiki pages. The tutorial on the Monday is in our high technology collaborative learning room LG3. This has collaborative designed furniture and each collaborative area has a computer that is networked, a data-projector and an interactive white board. In addition in the LRC there are group rooms that have a collaborative table, computer and data projector.

This paper will focus on the students self-reported factors that influenced their technology use.

Methods of inquiry

This study used a case study design with a mixed methodology. Data collection strategies used included interviews (26) three questionnaires and observation of both face-to-face and online activity. The study was in two stages. Stage 1 was when the students were in their second year; they filled in questionnaire 1 and were then allocated to groups based on their expressed choice of blend. Stage 2 was when the same students were in their third year, and included questionnaire 2 after the students had filled in the ground rules contract where they decide what blend they will use to complete the task, and then questionnaire 3 and interviews at the end of the period of study. Online trails were also used for analysis in stage 2. Analysis was carried out based on the deductive method.

Ethical approval for this study was gained from the Open University Human Participants and Materials Ethics committee (HPMEC).

Findings

The students were in their third year, having used StudyNet for the previous two years. They had a workshop session exploring the open source applications and the technologies available in LG3. They were put into groups based on an expressed individual choice at the end of year 2. The groups then agreed how they would work and prepared and gave weekly seminar presentations.

All groups used StudyNet, mainly the file sharer, texting on mobiles and discussion site for administrative process purposes, but face-to-face for co-construction of meaning. They used the classroom technologies extensively, and always met with a computer.

In making the choice of blend the following themes emerged:

- Past experience - use what you know works
- Efficiency - use technology to maximise efficiency
- Quality of interaction – need quality communication for co-construction
- Inclusivity – must include all of the groups participants
- Technology is compartmentalised

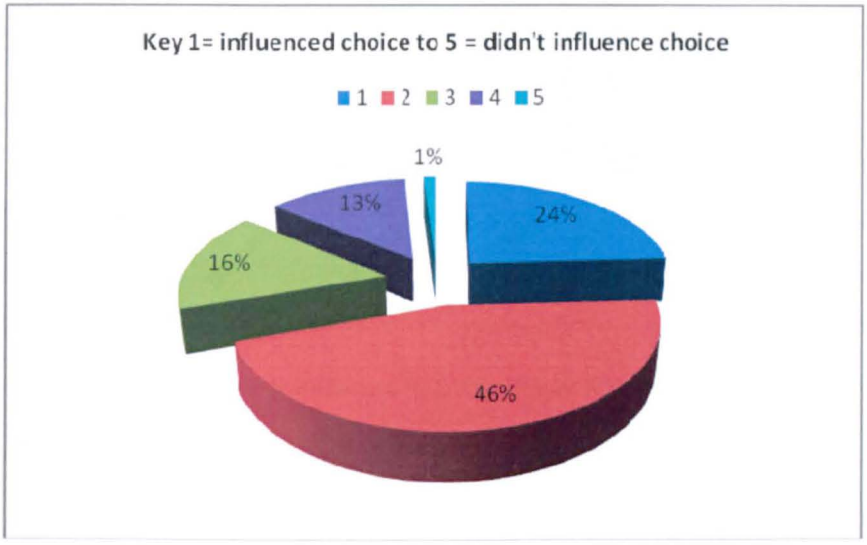
Past experience - use what you know works

The students wanted to use a blend of face-to-face and online technology; this reflected their experience in years 1 and 2.

> *"Most communication should occur regularly and in face to face meetings. Technology is a useful adjunct, but should not replace team meetings (i.e. both should compliment each other)." - Participant 44, Q1.*

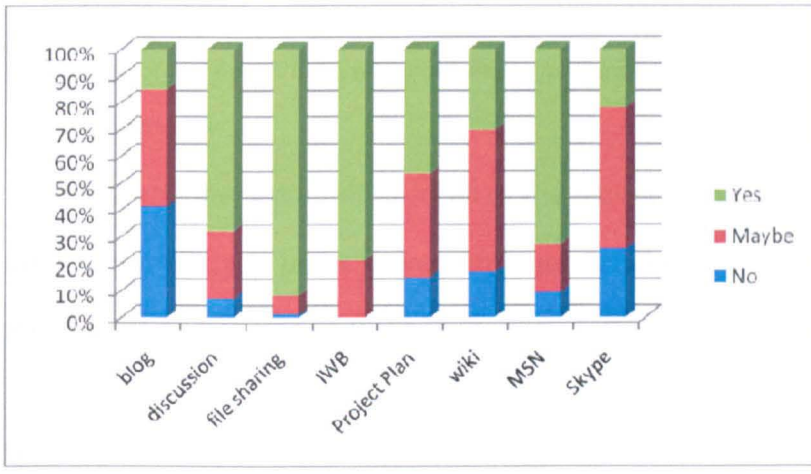
In the quantitative rating scale data 'previous experience' (figure 1) rated highly as influencing their choice.

Figure 1 Pie chart to show responses to 'Previous experience'



The students thought that they would use a range of technologies and were open to the idea of new technologies as expressed in their group sheet and questionnaire 1, see figure 2.

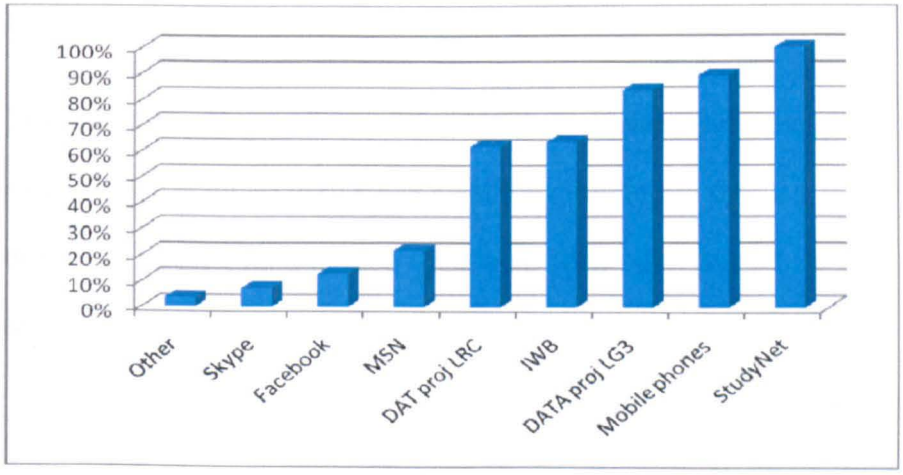
Figure 2 Technologies the students said that they wanted to use in questionnaire 1



Key: Technologies they wanted to use (yes), maybe wanted to use (maybe) and didn't want to use (no) these relate to individual responses.

However, when it came to actual use the students tended to use what they had past experience of see figure 3.

Figure 3 Technologies and applications used by the students – Questionnaire 3



"How I have worked before. Working face to face but I don't mind working sometimes with technology" – Participant 69, Q1

"It's not that I don't like using technology I just kind of stick to what I know." Participant 38, Interview

Students had therefore not used all of the facilities on StudyNet that they thought they would or used open source such as Facebook or Skype to the extent that they had indicated in questionnaire 1.

Use technology to maximise efficiency

Time was a major issue for the students, and expressed in all three questionnaires.

"The quickest, most effective method" –Participant 60, Q1.

"Time in Uni and how late lectures go on. Time outside of Uni with other module commitments. Time basically" – Participant 1, Q2

Finally at interview time still was recognised as a constraining issue.

"I think time was a big factor the blend I think, in the circumstances and the time pressure that we had". - Participant 25, Interview

They used the file sharer on StudyNet extensively. This meant that they could see each other's work so they knew what they needed to discuss which maximised the efficiency of their face-to-face meetings. All groups posted up their presentations, and additional resources, three groups used tagging.

"So it was usually dumping information on StudyNet and if people wanted to access it they could." – Participant 22, Interview.

They saw StudyNet as a repository, not as a means of communication.

"Whereas StudyNet I find is a brilliant resource, I see it more as a resource rather than a method of communication." - Participant 80, Interview.

When meeting students said it was automatic to put the computer on, by using a computer they could link online and face-to-face and upload immediately onto the group site. Students used the classroom technologies in LG3 for 'higher level' functions. Using the interactive white board and computers connected directly to the internet enabled them to capture their discussions real time and search the internet. This facility was highly valued by the students, who were very enthusiastic about LG3 at interview.

"The whiteboard in the .....we had four, five screens I think around the room, which I think was useful. I wish we could always have a room like that" –Participant 40, Interview.

Observation data of the students' activities in LG3 confirmed that the students were valuing the room; I had to be very 'encouraging' to get students to leave the room at the end of the session. When students met outside of the tutorial they tried to get a group room in the LRC where they have a data projector and computer, 33 (60%) of students in Q3 reported using group rooms.

Quality of interaction

Although efficiency was a factor it did not override the importance students placed on the quality of interaction. From the first questionnaire right through to every student who was interviewed the students stated that to collaborate (co-construction) face-to-face was essential.

> *"I think I definitely learn more from face to face than virtual means I'm more comfortable in that setting .. we did meet to discuss issues and somebody said something and someone else disagreed it was useful to have a mini debate because then you can really get to the bottom of the issue and resolve any potential conflict so I definitely...for me I found I learned better in a face to face setting." – Participant 63, Interview.*

All groups had face-to-face meetings in addition to the tutorial, some groups even meeting several times a day, and on almost every week day. The need to meet to face–to-face was mentioned by students in every interview. The students stated that they found the face-to-face communication enabled them to discuss more openly and fully, and provided a richness that they valued for their learning.

> *"I think face to face I just prefer it because you can just see what people are thinking more, you can just get a better feeling for what they want to do and they don't want to do and I just think they're more like likely to say what they want in that environment." – Participant 80, Interview.*

The students justified their choice of face-to-face by expressing concerns over text based communication.

> *"You can't interact properly over a computer, so I think face-to-face just enables decisions to be made quicker and it just bonds that group in terms of presenting." Participant 8, Interview.*

The students would only attempt to communicate online if students had commitments that made it impossible to meet face-to-face, for example childcare or sport. Although even then they would plan around this. Students commented that as they were in most days at UH there was no need for online communication.

"face-to-face during the day, technology at night where necessary". - Participant 3, Q1.

The emphasis on - "*where necessary*", reflects that most of the time it was not necessary as they were on campus and so met face-to-face.

Inclusivity – must include all group participants

The students expressed at interview that everyone must be involved in decision making, and changing work. If one student from the group didn't have a technology then they wouldn't use it. This should have been avoiding by putting the students in groups based on their expressed choice but in some groups this didn't seem to be the case. As expressed in questionnaire 2, to the questions what influenced your choice?

"What everyone has access to." – Participant 58, Q2

This was also mentioned at interview:

"No we didn't use MSN because not everyone used it straight off and not everyone had the Internet where they were living so that was a no go."- Participant 42, interview.

They valued the technological applications that gave everyone equal access to information such as the data projector in LG3 and LRC group rooms where they could all see the output, and the StudyNet file sharer where everyone could see all of the information.

*"StudyNet there .. was no possibility of that [*anyone not knowing*]. Everybody had access to the same material" –Participant 27, Interview*

The students found using a data projector preferable to crowding around one laptop; as if they had to do the latter it inevitably it meant that they didn't all have equal access and ability to participate.

> *"slides on the large screen as we did in LG3 so...I thought that was really helpful again everyone looking at the slide, everyone can see it and can just comment on it straight away instead of like peeking through." - Participant 40, Interview*
>
> *"It was a bit difficult sometimes because congregating around one computer in the libraries always puts somebody on the outside and it's quite difficult for them to always get their opinions ..." – Participant 27, Interview.*

Participant 11 eloquently summarised the difference between the facilities.

> *"The group room is much more accommodating for a group but then when you're out in the LRC it is very individual ...the computers are set up so you work individually so that's a problem." - Participant 11, Interview.*

Technology is compartmentalised

The students had clear boundaries between the educational technology and the social open source applications e.g. Facebook. They valued StudyNet and expressed that this was their educational technology, it was used by all of them regularly and reliably.

> *"I mean StudyNet was in use twenty four seven for it. If we didn't have StudyNet I don't really know what we would have done ... StudyNet was fantastic. Use it, go on it, 'I don't know how' many times a day." – Participant 21, Interview.*

Although on the quantitative data 10% of students said they had used Facebook and 20% said, this included one group who had set up a Facebook group but never used it. The interview responses suggested that the use of open source was minimal. All of the students interviewed expressed a desire to keep education and social technology separate.

> *"Yeah. Kept it separate. It was nicer to have kind of keep work separate from kind of social life ..." - Participant 15, Interview.*

Discussion

Past experience will influence engagement (Sfard, 1998), so it is not surprising that the students based their choice on their previous two years at UH. The students were studying a professional course and so saw tutors and clinical educators as role models, and have been socialised to learn in specific ways. This cohort's past experience of a learning discourse on physiotherapy has been largely as a face-to-face activity, the students were adopting the ways-of-behaving (Handley et al, 2006) that their lecturers had used. Whilst the discussion sites have been used in the programme, the majority of posts have been questions posed by students often answered by tutors, and focused around procedural and administrative aspects (Alltree and Thornton, 2004, Thornton and Alltree 2002). In other studies (Davies et al., 2005, Hughes and Daykin, 2002) some students didn't see using technology as a requirement for their professional role. This was not expressed by the students in my study, and perhaps reflects the changing technological environment.

But the profession is changing with recent developments by the Chartered Society of Physiotherapy that have included the development of online interactive discussion forums called ICSP (www.interactivecsp.org.uk), and an electronic portfolio for continuing professional development. Subsequent cohorts have used Web 2.0 technologies with the use of wiki's and podcasts being introduced early in year 1 (Anders and Thornton, 2008) and then used for an online collaboration while the students are on placement at the end of year 1 (Rickard, 2009).

The time pressure reflects a course that has 1000 clinical practice hours; this didn't lend itself to asynchronous communication via discussion sites. The importance of the "*immediacy*" p120 of response (Conole and Dyke, 2004) led to the students using mobile texts e.g. "where is the meeting?", rather than StudyNet. In a study by Peacock and Hooper (2007), time was also identified as a theme, students identified that to use the asynchronous discussion site required them to log on, read posts, write a post and the whole interaction was time consuming, the undergraduate students felt that this made online discussions "*inappropriate*" p226.

The students used face-to-face communication for their co-construction of knowledge. It is recognized that the face-to-face environment provides high social presence (Garrison and Vaughan, 2008). Ausburn,(2004) found that students experienced in a blended environment rated discussion online in the bottom rank of features that they wanted provided on an MLE, they suggest students do not see the online as fulfilling this need that is met by face-to-face. The results are congruent with a study by Curran et al. (2008). Curran et al's (2008) survey of 520

undergraduate health students, who had much greater satisfaction with face-to-face, case based learning than with asynchronous online discussions.

The students used the file sharer on StudyNet as a repository. This "off loads" (Suthers, 2006) some of the activities of learning onto the technology as the students could see what needed to be discussed face-to-face. However conversely this could be interpreted as the students being engaged more in gathering information than in engaging in active learning. In Peacock and Hooper's (2008) study of physiotherapy students the undergraduate students use of an MLE was focused on gathering and storing of information rather than engaging with it. The key difference for the students in my study is that the students had engaged to apply the information to practice case.

The students valued LG3, it would make "*a big difference*" if they had such learning spaces always available to them. They valued using technology to link the classroom and online experiences, in an efficient manner. This fits with the transformative approach of blended learning including the classroom not simply adding online components but linking the physical and online "*in a seamless manner*" p27 (Garrison and Vaughan, 2008), such that the boundaries between physical and virtual become blurred (Armstrong and Franklin, 2008).

Access and availability of technology was not mentioned by many students during the interviews. That this didn't seem to be a major issue reflects possibly the organization of groups, putting students who wanted to use a technology together,

and the increasing availability of technology (Garrison and Vaughan, 2008) e.g. Wi-Fi has been introduced on campus.

Although by StudyNet has excellent facilities and the students were positive of its use, they don't have access to synchronous group technology that is not text based. Hrastinski (2008) suggests that synchronous provides a better environment for "*personal participation*" and for "*convergence on meaning*"p52. A few students did use Skype to some extent. The importance of the social presence provided by the face-to-face communication is well recognised and has been shown that high social presence is most significantly associated with group cohesion (Garrison and Vaughan, 2008) which the students valued.

All of the students interviewed had used a social networking site, the most common being Facebook (www.facebook), others mentioned were MySpace and Beebo, but wanted a clear split between their educational and social technology online. Some students thought these sites were too distracting for "work", a finding also found in a review (Armstrong and Franklin, 2008). The demos report "their space" (Green and Hannon, 2007) found that some students saw lecturers going onto social networking sites as an invasion of their space whereas others welcomed it. Their desire for this distinction may be discipline specific and a reflection of their professional identity.

Conclusion

This study suggests that to further enhance students experience on this module there is a need to develop more high technology classrooms, to introduce online technologies in a structured way earlier in the course and for tutors to model their

use. The use of voice based synchronous technologies needs exploring within this discipline. Tutors should not expect students to use social networking sites for study.

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Biography

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